THE IMPACT OF E-PROCUREMENT SYSTEM QUALITIES AND TRUST ON END-USER SATISFACTION

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THESIS SUBMITTED IN FULFILMENT
OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY

FACULTY OF BUSINESS AND ACCOUNTANCY
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KUALA LUMPUR

2014

ABSTRACT

The main aim of this study is to investigate the impact of the e-procurement system qualities and trust on the e-procurement system end-user satisfaction, in a mandatory system environment. In line with this objective, three research questions are established: **First**, what are the e-procurement system qualities that influence trust and end-user satisfaction? **Second,** what is the impact of trust on end-user satisfaction? **Third,** does trust mediate the relationship between e-procurement system qualities and end-user satisfaction? This study postulates that suitable e-procurement system qualities and trust, as perceived by system end-users, have influence on the e-procurement system end-user satisfaction.

IS success model is adopted to describe the causal linkages between the determinants that affect e-procurement system end-user satisfaction. This research study investigates end-user's experiences with e-procurement system and their impact on user's belief 'trust' to evaluate e-procurement system end-user satisfaction. The users' experiences are classified into direct user's experience with the system, represented by perceived e-procurement system quality construct, and indirect user's experiences, represented by perceived order fulfillment quality of suppliers as perceived by system end-users ['buyers'].

A questionnaire that reflects the proposed framework constructs is developed to collect the primary data for the study. The data is collected from 432 e-procurement system users who are working at the purchasing departments in Malaysian governmental Ministries, Agencies, and Departments. This study is quantitative with a deductive approach. It employs partial least squares structural equation modeling (PLS-

SEM) to validate and confirm research model to test the relationships being hypothesized.

The findings of this study provide empirical evidence for the significant impact of perceived e-procurement system quality, perceived order fulfillment quality, and trust on e-procurement end-user satisfaction. Furthermore, the study findings approve the influence of both system qualities, namely perceived e-procurement quality and perceived order fulfillment quality on trust. The findings reveal that perceived e-procurement quality positively influences perceived order fulfillment quality. Finally, trust is found to have partial mediating effect between system qualities and e-procurement system end-user satisfaction.

ABSTRAK

Tujuan utama tesis ini ialah untuk menyelidki kesan kualiti sistem eperolehan dan kepercayaan terhadap kepuasan pengguna akhir sistem eperolehan dalam persekitaran sistem wajib. Tiga soalan kajian telah dibuat untuk mencapai tujuan ini. Soalan pertama ialah “Apakah kualiti sistem eperolehan yang mempengaruhi kepercayaan dan kepuasan pengguna akhir sistem eperolehan?” Soalan kedua ialah “Apakah kesan kepercayaan terhadap kepuasan pengguna akhir sistem eperolehan?” dan soalan ketiga ialah “Adakah kepercayaan merupakan pengantara kepada hubungan di antara sistem eperolehan dan kepuasan pengguna akhir?” Tesis ini mencadangkan bahawa kualiti dan kepercayaan terhadap sistem eperolehan yang sesuai seperti yang ditanggap oleh pengguna memberi kesan terhadap kepuasan pengguna akhir sistem eperolehan. Sistem kualiti merangkumi sistem kualiti lansung yang diwakili oleh tanggapan kualiti sistem eperolehan, kualiti sistem tidak lansung yang diwakili oleh tangapan kualiti memenuhi pesanan.

Model kejayaan Sistem Maklumat telah digunakan untuk menjelaskan hubungan kausal di antara penentu yang mempengaruhi kepuasan pengguna akhir sistem eperolehan. Tesis ini menilai pengalaman kepuasan pengguna akhir terhadap sistem eperolehan dan kesan kepuasan pengguna akhir terhadap “kepercayaan” pengguna. Pengalaman pengguna diklassifikasikan kepada pengalaman lansung pengguna terhadap sistem yang diwakili oleh konstruk tanggapan terhadap kualiti sistem eperolehan dan pengalaman tidak lansung pengguna terhadap sistem yang diwakili oleh tanggapan oleh pengguna “pembeli” akhir sistem terhadap kualiti pemenuhan pesanan oleh pembekal.

Dengan menggunakan kajian soal selidik, data telah dikumpul daripada 432 pengguna sistem eperolehan yang bekerja di Jabatan Pembelian di kementerian, agensi dan departmen kerajaan Malaysia. Kajian ini menggunakan separa dua terkecil pemodelan persamaan struktur (PLS-SEM) untuk mengesahkan model kajian dan untuk menguji hubungan yang dihipotesiskan.

Penemuan tesis ini memberikan bukti empirikal bagi kesan signifikan tanggapan kualiti eperolehan, tanggapan kualiti memenuhi pesanan dan kepercayaan terhadap kepuasan pengguna akhir sistem eperolehan. Tambahan pula, penemuan kajian bersetuju dengan pengaruh sistem kualiti; tanggapan kualiti eperolehan dan tanggapan kualiti memenuhi pesanan terhadap kepercayaan. Dan juga, penemuan menunjukkan bahawa tanggapan kualiti eperolehan mempengaruhi secara positif tanggapan kualiti memenuhi pesanan. Akhir sekali, kepercayaan didapati mempunyai kesan pengantara terhadap kualiti sistem dan kepuasan pengguna akhir sistem eperolehan.

ACKNOWLEDGEMENTS

This thesis is dedicated to the soul of my grandmother who encouraged me to be the best I can be, to have high expectations and to fight hard for what I believe. She always provided me with strength in life. I feel she is always with me caring and motivating.

Only a cooperative effort can make it possible to complete such a challenging task as this PhD research. I am glad to acknowledge a number of people who - in many different ways - have walked me along this journey.

My supervisors, Prof. Ainin Sulaiman and Dr. Noor Akma Mohd Salleh; thank you for your support and constructive guidance throughout my PhD.

I would like extend my sincere thanks and deep gratitude to the Finance Ministry’s Electronic Procurement Project Director, Dato' Hj. Abd Shukor Bin Ibrahim and Deputy Project director Puan Nor'Aini binti Abdul Razak for providing facilitation for data collection for this study. I would like to thank ePerolehan unit staff especially Sahubar Ibrahim bin Ismail Ghani, Norsiah binti Mohamad, and Nur Safura for their support in data collection, without their support this work could never have been done.

My family, father and mother, the sparkling diamonds I have been gifted, they have been sources of the inspiration and willpower that I enjoyed along the way. Their faith, love, prayers, understanding and financial support are my true power.

My dearest aunt, Nafitha has always believed and continues to believe in me. Her encouragement is always uplifting and her faith in me never fails.

My brothers, Rami, Shadi, and Fadi; and my sisters, Suhad and Fidaa who are my heroes. They have always been an inspiration and “the wind beneath my wings.”

My best friends, Sharon Chang Fang, Thinaranjeney Thirumoorthi, Sedigheh Moghavvemi who are my source of invaluable advices and support in my research journey, they fulfill my life in Malaysia with joy and memorable experience.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

In recent decades, several organizations have made massive investments in information systems (IS) with the purpose of improving their organizational performance. For instance, organizations have invested in different kinds of information systems, such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and E-procurement Systems (eP). The main purposes of the massive investment in different types of IS are to enhance management and operational performance (Klein, 2012), boost returns on investment, sales revenue and market share (Johnson and Lederer, 2010), increase employees' productivity (Jain and Kanungo, 2005) and satisfaction (Wang and Hsieh, 2012). In spite of the massive investment in different types of information systems, the performance of organizations investing in these IS can only be recognized when these systems are used to attain the objectives of the organizations (Chang et al., 2010).

For the last two decades, governments have operated e-government technologies geared toward delivering electronic information and services to individuals as well as businesses (Torres et al., 2005). Wang and Liao (2008, p. 718) define e-government as "a government's use of ICT, particularly Web-based Internet applications, to enhance the access to and delivery of government information and service to citizens, business partners, employees, and other agencies and entities." Nowadays, e-government is seen as a global phenomenon technology that supports the public sector by improving the delivered services and enhancing the government efficiency (Banerjee and Chau, 2004; Lu et al., 2012b). Furthermore, many nationwide governments have found the necessity to establish online websites wherein they offer e-government services (Norris and Curtice, 2006).

Public procurement is considered as one of an essential functions of a federal government (Thai, 2001). Public procurement is defined by the World Bank (1995) as the use of public funds to purchase products and services. As a fact, public organizations have invariably been massive buyers, working with enormous financial budgets (Roodhooft and Abbeele, 2006). Thus, public sector procurement is huge and sophisticated, accounting for 20-30% of gross domestic product (GDP) (Thai and Grimm, 2000). Recently, Mahmood (2010) mentioned that public procurement represents 18.42% of the world GDP. The enormous sums of money used in government procurement are public funds. Therefore, accountability and transparency of the use of these funds (Hui et al., 2011), to protect public interest, are required (Rasheed, 2004). This can happen by fulfilling the necessities for products, functions, systems, and services in a timely manner (Vaidya et al., 2006). For this reason, the e-procurement system is widely acknowledged by global public sector agencies as the main concern in e-government agenda (Vaidya et al., 2006). Barua et al. (2001, p. 38) consider e-procurement as "the most important element of e-business operational excellence for large corporations". Governments e-procurement was defined by Leipold (2004, p. 3) as the system used by government agencies to procure work, goods, and services from suppliers to manage the public sector.

Information Systems (IS) in general and e-government projects in particular, have several different and complex challenges that are not easy to conquer (Gil-García and Pardo, 2005). Goldfinch (2007, p. 917) claims that, "the majority of Information System (IS) developments are unsuccessfu1. The larger the development, the more likely it will be unsuccessful." Based on the literature, there are two main reasons that cause the failure of IS in general and e-procurement in particular. Firstly, large systems scale and scope are greatly subjected to failure (Goldfinch, 2007; Heeks, 2002). Secondly, the complexity of the system boosts the risk of failure (Goldfinch, 2007; Melin and Axelsson, 2009). In general, the systems which are under mandatory use are not flexible systems (Boudreau and Robey, 2005). Vaidya et al. (2004) and Goldfinch (2007) pointed out that the chance to succeed in e-government projects was estimated at only 30%. The same percentage can be applied to e-procurement systems as an integral component of an e-government project (Panda and Sahu, 2012). There are as well some evidence reporting the failure in implementing e-procurement system (Chang et al., 2008).

Some scholars agreed that most IS failed to fulfill their objectives, not because they have technical issues, but mainly because psychological and organizational matters are not properly treated throughout the development, execution, and use of the system (Franklin et al., 1992; Markus and Keil, 1994). In other words, the system users who were unwilling to use available systems and were dissatisfied with the system, often convert technically effective systems into failure (Doll and Torkzadeh, 1989). Several IS suffer from failure because of the resistance or low acceptance by users, due to refractoriness, lack of knowledge, inadequate training as well as system complexity (Goldfinch, 2007). A study by Aberdeen Group (2006) shows that many organizations were not satisfied with the implementation of E-procurement System, due to non-compliance of the users. However, they state that the percentage of compliance in the transaction is 65% on average. Meanwhile, in other reports, the percentage of Maverick Buying is about 24% on average (Aberdeen Group, 2003). As a consequence of mandating the usage of a particular technology, system users who do not completely welcome the technology, can certainly delay or hinder the implementation, and underutilize or even ruin the system (Leonard-Barton, 1988; Zuboff, 1988).

Furthermore, when an organization mandates the use of the system, individuals retain considerable discretion regarding their use of some system features (Hartwick and Barki, 1994). Obviously, the absence of IS end-users' acceptance cause mismatch between IT system and organizational performance (Devaraj and Kohli, 2003).

Thus, to make sure that e-government is achieving success and performing well, it is essential to evaluate its performance by measuring the system end-user satisfaction. Hence, suitable reactions and improvements will be based on such evaluation (Gupta and Jana, 2003). Evaluating the performance effectiveness or success of information systems within businesses is certainly recognized as the most critical issue in IT/IS management discipline (Ball and Harris, 1982). Little work on effectiveness of public online systems has been done (Torres et al., 2005) in comparison with private sector (Aini and Hasmiah, 2011). In general, the results of investigating e-government system success remain inconclusive (Wang and Liao, 2008) and investigation on e-procurement in public sector is very limited (Aini and Hasmiah, 2011; Croom, 2000; Tonkin, 2003). Probably few have reviewed in-depth the government e-procurement implementation issues and the way the governments conquer these issues (Aini and Hasmiah, 2011). Therefore, this study intends to evaluate government e-procurement system performance by investigating the critical determinants that influence its end-user satisfaction.

1.1.1 Research on IS Satisfaction

In recent years, continuing research efforts show several attempts to investigate various system performance by either financial measures (Dong, 2012; Kohli et al., 2012; Lee et al., 2010) or non-financial measures (Bradley et al., 2012; DeGroote and Marx, 2013; Hartono et al., 2010). Studies were conducted under several levels of analysis, such as industry level (Otim et al., 2012), firm level (Jeong and Stylianou, 2010; Klein, 2012), group and team level (Barkhi and Kao, 2011; Pinjani and Palvia, 2013) and individual level (Lin et al., 2014; Turel et al., 2011). However, among various sorts of evaluation of IS performance, end-user satisfaction is found to be among the most popular non-financial measures (DeLone and McLean, 1992; Thong and Yap, 1996), as it is seen as a surrogate measure to performance (Ives et al., 1983). Aladwani (2002) points out that the most effective way of measuring e-procurement system performance is to measure the level of user satisfaction with the aid of the system. Au et al. (2008) defines user satisfaction as the sum of experiences that the user acquires from the interaction with technology over time as well as represented users' cognitive evaluation of the entire IS user’s experience. Brown et al. (2002) argue that user satisfaction had an exclusive and essentially critical role in evaluating system success in mandatory contexts, as it is the case in government systems. According to several scholars, a system which cannot fulfill users’ requirements is a failure by definition (Doll and Torkzadeh, 1989; Guinan et al., 1998; Ives et al., 1983). Therefore, an effective system, recognized by its users as ineffective, is in fact an unsatisfactory system (Doll and Torkzadeh, 1988; Ives et al., 1983; Thong and Yap, 1996). Nah et al. (2004) point out that user’s acceptance doesn't indicate that there was no user’s reluctance for mandatory IS. Thus, some users show their resistance to the system by underutilizing it (Kim and Kankanhalli, 2009) or by delaying or obstructing the implementation (Leonard-Barton, 1988).

Mainly because user satisfaction is a crucial determinant of system success, achieving end-user satisfaction is a concern of any organization especially if the system is mandatory, complex, and related to public sector. However, Goodhue (1995) mentions that researchers’ proposition of ‘higher information system performance causes higher user satisfaction’ had not been regularly proven in the past research. Many scholars have mentioned that user satisfaction is among the major factors ultimately causing Information Systems (IS) success (Al-Khaldi and Olusegun Wallace, 1999; Gelderman, 1998; Szajna and Scamell, 1993). However, factors which lead to the recognition of user's requirements and therefore satisfaction, are often confusing to identify because of their complicated inter-relationships (Adam Mahmood et al., 2000). The common argument for the user satisfaction approach is the fact that higher levels of user satisfaction lead to higher levels of performance (Kositanurit et al., 2011). Several research studies on user satisfaction have been carried on during the last decade to find out the factors of IS that cause optimum user satisfaction and consequently system performance (DeLone and McLean, 1992; Hendrickson et al., 1994; Torkzadeh and Doll, 1991).

Several studies also found that system quality and trust are related to user satisfaction (Balasubramanian et al., 2003; Kassim et al., 2012; Lu et al., 2012a; Wu and Chen, 2005). Balasubramanian et al. (2003) examine customer's satisfaction of online investors of web-based broker sites. They found a significant and direct relationship between trust and user satisfaction. In addition, the results show that environmental security and operational competence had a significant impact on the level of trust. Therefore, trust is a result of system users' acceptance; it affects end-user satisfaction (Kassim et al., 2012; Lu et al., 2012a; Wu and Chen, 2005). In user-developed application context, there is proof that user satisfaction is influenced by system quality (McGill et al., 2003). Poor information content quality may decrease users' satisfaction as they anticipate to get quality information from using e-procurement systems (Zhou, 2013). Throughout the literature, system quality was operationalized in several different ways. However, it has a significant positive relationship with system performance in general and end-user satisfaction in particular (Kassim et al., 2012; Klobas and McGill, 2010; McGill et al., 2003; Wang and Liao, 2008; Zhou, 2013).

Based on the previous discussion it is a likely reason for current IS/IT studies to focus on the factors that impact end-user satisfaction, is as a surrogate measure to performance in specific contexts. Therefore, this study attempts to investigate and examine the impact of trust and e-procurement system qualities on the end-user satisfaction in government e-procurement systems.

1.1.2 Research on Trust

System users' trust is a crucial factor that determines the success or failure of e-commerce (Klafft, 2009). In the literature, several scholars have determined the deficiency of trust among the premiere factors behind consumers avoiding trading with e-commerce (Ayo et al., 2011; Gefen and Straub, 2003; Jiang et al., 2008), and it is considered as one of the reasons for resistance of users to use the information systems (Kusuma and Pramunita, 2011). In mandatory-use systems, the role of trust plays an important role. However, in the absence of system trust, users may find alternative ways to conduct their work or their job tasks (Karjalainen et al., 2009). As such, strengthening individual trust is usually viewed as a vital factor for the effective implementation of e-government online websites (Warkentin et al., 2002). Data released by the Internet Crime Complaint Center (2005) shows that trust is a major issue in e-procurement systems. Recently, Kusuma and Pramunita (2011) state that e-procurement system users tend to refuse using the system because of its risk and untrustworthiness. In other words, trust is a critical key that plays a significant role in predicting users behavior in IS context (Gefen et al., 2003; Mahmood et al., 2004).

Referring to the literature, several studies show that trust can be enhanced by improving system quality as well as fulfilling users' expectations (Nicolaou and McKnight, 2006). In online context, trust is considered as a positive belief in the system characteristics, information and the honesty of the suppliers (Kini and Choobineh, 1998;

Sambasivan et al., 2010). de Vries (2004) outlines three reasons for users to trust a particular system. First, *moral obligation of its vendor*; users trust the functionality of the system simply by trusting the vendor, representative or designer of the system. Second, *interaction*; inadequate interactions with a system negatively affect the trust. Third, *experience*; positive experience positively affects the trust level, while negative experience negatively influences the trust. Blomqvist (1997, p. 283) emphasizes that "trust is based on experiences." In online environment, trust is developed when a buyer has a positive experience with a supplier by means of things such as order fulfilment, service, and product quality (Urban et al., 2009). Positive experience positively affects the trust level while negative experience negatively influences the trust. Nicolaou and McKnight (2006) find that perceived information quality has a significant influence on trust and risk which also has a significant influence on the intention to use data exchange between organizations. In context of student information systems, Kassim et al. (2012) find a significant positive relationship between system quality and trust. Study on Information Technology artifacts by Vance et al. (2008) reveals that the perception of system quality has a significant positive influence on user's trust. Belkhamza and Wafa (2009) argue that in an online environment, perceived system risk has a negative influence on behavior certainty and trust. To our knowledge, few studies investigate the relationship between trust and user satisfaction in an e-procurement context.

In an e-procurement environment, it is plausible that the perception of risk emerges for several reasons. First, remote, not personal, interaction between both parties (buyers and suppliers). Second, the inadequacy of information between parties and the uncertainty of products quality (Belkhamza and Wafa, 2009). Third, lack of the ability to match or to go above buyer's expectations in fulfilment (Harrington, 2000). In other words, distrust indicates violations of buyer's expectations (Zhang et al., 2011).

Schwind et al. (2011) identify lack of e-fulfilment and lack of trust as the major issues in online environment. The remedy is to reduce risk and trust barriers which happen due to the uncertainties in protecting private business information and in coping with anonymous suppliers (Subba Rao et al., 2007).

1.1.3 Research on IS Quality

Nowadays the importance of government e-procurement systems impels the governments to concentrate on system quality to achieve and leverage the services which are provided to the public. Thus, more attention to the quality of the system needs to be addressed. System quality is defined by DeLone and McLean (1992, p. 64) as, "Measures of the information processing system itself," while Wu and Wang (2006) view it as operational features. Guimaraes et al. (2009, p. 42) point out that “the quality of something so important must be assured.” Here, Guimaraes explains that various IS are essential to organizations for several reasons. They represent the base of organizational process, source of decision making at different organizational levels, and moreover, all industry sectors depend on them for their very existence. A main concern of organization regarding the use of IS is providing superior system quality to the user (Parasuraman et al., 1988). While, from users’ perspective, system quality is believed to be a crucial motivating factor for individuals to use the systems and to derive any benefits needed for organizations to achieve a return on their investments (Rai et al., 2002).

It is plausible in the literature that managing and enhancing system quality is a complicated and expensive task in today’s system advancement. Guimaraes et al. (2009) state that even with consistent efforts to better the system development process, controlling quality remains challenging in today's development environment. Gichoya (2005) and Hawking et al. (2004) confirm the presence of some common barriers to IS system success, which include weak infrastructure, poor management support, bad system and information quality, poor system capability, system integration, and unskilled staff. Luftmann and Kempaiah (2008) reveal that ‘‘Improve IT quality” emerge among the top five issues facing IT executives. Guimaraes et al. (2009) mention that limited and insufficient published empirical studies on system quality have made it complicated for project managers to properly utilize available metrics and approaches in management and quality control.

Many studies have been conducted focusing on the quality of IS systems. For example, in their IS success model, DeLone and McLean introduce and discuss three different quality constructs; system quality [technical quality], information quality [information provided by the system], and service quality [support and assistance provided to users]. Additionally, they claim that those qualities somehow influence organizational performance as well as individual performance and satisfaction (Delone, 2003; DeLone and McLean, 1992). A massive number of studies deployed IS success models to investigate different types of systems. However, the results report controversial findings. For example, Negash et al. (2003) investigate web-based customer support systems by evaluating the impact of system qualities on user satisfaction. Their study shows a significant relationship between system quality, information quality, and service quality with user satisfaction. On the contrary, Wang and Chiu (2011) find significant relationship only between information quality and service quality, but not between system quality and user satisfaction on eLearning. Meanwhile, Ainin et al. (2012) in their study on National Higher Education Fund Corporation (PTPTN) find no significant relationship between system quality, service quality, and information quality on system performance represented by user satisfaction. All these studies indicate mixed results that need further investigation to ascertain more conclusive results or outcomes.

On the other hand, Pitt et al. (1995) criticize DeLone and McLean's Information Systems Success Model DeLone and McLean (1992) for being product-oriented. They argue that the model concentrates only on information quality and system quality, thus leading to measurement bias. In addition, the majority of the studies that deploy IS success model focus on the quality towards system performance and/or end-user satisfaction of the individuals, consumers, and employees and ignore the characteristics of the system (Brandon-Jones, 2006). In general, each IS has different characteristics and therefore each system has different quality measures (Brandon-Jones, 2006). For instance, the government e-procurement system has its special and unique environment. The e-procurement system presents a unique challenge for implementation as it extends across various organizations and throughout existing departments or agencies (Gil-García & Pardo, 2005). Moreover, in government e-procurement systems, the main parties are buyers who are represented in the purchasing departments of government agencies. In other word, they are the government employees, and of course the suppliers (Kaliannan et al., 2009a). The interactions and transactions between both parties (government employees-buyers and suppliers) are crucial and must be fully utilized to achieve the purpose of the system. Guimaraes et al. (2009) emphasize that system quality elements rely on the characteristics necessary to the system as well as on the stakeholder's view. Thus, this study aims to investigate and identify government e-procurement system qualities dimensions that suit the government e-procurement system unique environment as well as the system stakeholders (i.e. the employees). Furthermore, this study aims to examine the influence of e-procurement system qualities on trust on end-user satisfaction.

1.1.4 SCOPE OF THE STUDY

Malaysia is one of the developing countries that adopt and employ a variety of technologies in various fields and industries. Malaysia released e-government as one of the Multimedia Super Corridor (MSC) Flagship Applications with the desire to utilize multimedia technologies to redesign the strategy in which the government operates. Its aim is to enhance internal government operations as well as to provide external services to Malaysian citizens and businesses. In 2012, at the MSC Malaysia International Advisory Panel (IAP) meeting, the Prime Minister, YAB Dato' Sri Mohd Najib Tun Razak, announced the Digital Malaysia Project as an aspiration to steer Malaysia's economy to become a Developed Digital Economy by 2020 (ePerolehan Official Portal, 2013).

Moreover, with the aim to reach the prospects for a universal electronic economy, e-government performs a progressively more essential role in promoting the improvement of government functions efficiently and in developing service-oriented government (ePerolehan Official Portal, 2013). As a step for improving Governmental Operations, in 1999 the Government of Malaysia assigned CommerceDotCom Sdn. Bhd. (CDC) to build and run the e-procurement system project on Build-Operate-Transfer (BOT) basis. (CDC) established e-procurement systems called ‘ePerolehan’, which consist of six modules named central contract, direct purchase, quotation and tender, and electronic reverse auction or eBidding, which are presented in Table 1.1. In 2002, the Government of Malaysia, represented by the Finance Ministry, launched and monitored ePerolehan application as one of several e-government applications. ePerolehan is a form of Government to Business G2B service that entails all the interaction or transactions between government and businesses. Kassim and Hussin (2010c) point out that G2B is one of public sector inter-organizational systems. In other words, it is an important component of e-government systems as it improves the service quality between government and public business. Siau and Long (2009) state that the main objectives of G2B environment are to improve business services and to minimize the procurement cost of the government by utilizing e-business technology.

Table 1.1: ePerolehan Modules and Services

Module	Services
Supplier registration	• Registration as New Contractor/Consultant to the Government of Malaysia, renewal, application for additional category, online update of company profile
Central contract	• Requisition Processing: The requisition process starts when the Government User selects products or services to procure and ends when a purchase order (PO) has been sent to the Supplier. • Order Fulfilment: The order fulfilment process involves acceptance of the PO by the Supplier, fulfilment of order by the Supplier and confirmation of receipt of goods or services by the Government User.
Direct purchase (purchase worth up to RM50,000.00)	• Requisition Processing: The requisition process starts when the Government User selects a product to procure, and it ends when a purchase order (PO) is sent to the Supplier. • Order Fulfilment: The order fulfilment process involves the fulfilment of order by the Supplier, confirmation of receipt of goods by the Government User and the Payment to the Supplier.
Quotation system (purchase worth up to RM200,000.00)	• Quotation process is for any purchase with a total value of RM100,000 but less than RM200,000. • Through the quotation process, invitation is sent out to the identified suppliers which enables prompt response from the suppliers
Tender system (purchase worth more than RM200,000.00)	• Tender is for procurement with the value of RM200,000 or more. • The suggested system will simplify the procurement process, as online transaction will be quickly and securely implemented.
E-bidding	• Enable interested and qualified suppliers to bid online, anywhere within the bidding period. • Module enables bidders to view their current bidding status and bidding level.

(Source: Kassim and Hussin, 2010b)

The ePerolehan system is an end-to-end, multi-buyer and multi-supplier e-procurement system that allows Government Agencies across Malaysia to purchase products and services electronically from both local and international suppliers. It employs online technologies to connect Malaysia Government Agencies and Suppliers all over the world into a digital transacting environment (Rashid, 2007). Moreover, ePerolehan transmits traditional manual procurement procedures into the e-procurement system by simplifying federal government purchasing functions and raising the quality of service (Rashid, 2007). By converting traditional manual procuring procedures into an electronic system, ePerolehan procurement system facilitates the selection of order items by using system interface, placing orders, processing, and approving orders, in addition to providing other electronic documents (Kaliannan et al., 2009a).

The Government of Malaysia, represented by Ministry of Finance, mandated the use of ePerolehan system among system users in all the government ministries, agencies, and departments that are equipped to use ePerolehan system. Since 2002, 2563 *Pusat Tanggungg Jawab* (PTJs), out of 2622 PTJs, have been enabled to use ePerolehan within eight government ministries (ePerolehan Official Portal, 2013). Massive number of transactions were reported. ePerolehan recorded up to RM14 billion (US$4.6) in transactions in 2011, as reported by IOS Press (2011). Recently, ePerolehan Official Portal (2013), reported the number of transactions that were performed by PTJ online, between January-September 2013, to be (2,281,970) transactions. In general, there are five objectives encouraging Malaysian Government to adopt e-procurement systems, as illustrated in Table 1.2.

Table 1.2: Five Best Practice Procurement Objectives

Objectives	Description
1. **Minimise TCO**	Achieve initial and ongoing cost savings by reducing the total cost of products procured. Elements of total cost include: • Initial product costs, including handling and processing costs; • Operating costs, including maintenance, user support, etc.; and • Business impact costs, including, for example, costs associated with low productivity or user dissatisfaction and with business downtime. To achieve this objective, procurement departments of Malaysian GLCs should consider all the costs associated with choosing a particular product or service, not just the initial price paid.
2. **Ensure efficient procurement cycle times**	Make the procurement function more effective by ensuring it delivers the products ordered in a timely and efficient manner. This will deliver benefits including reduced downtime and quicker delivery of products/services, and will improve the procurement departments of Malaysian GLC's ability to respond to competitors.
3. **Enhance transparency and eradicate corruption**	Minimize opaqueness in the procurement process by adopting a clear disclosure policy and using a-procurement where possible. Cultivate an ethical working environment that will reduce corruption, enable products to be purchased at competitive market prices, and ultimately improve profitability.
4. **Enhance organization capabilities and governance**	Develop an in-house procurement function to support the company's long term profitability objectives. In addition, put policies, incentives and penalties in place to ensure that all relevant parties follow the agreed practices and processes.
5. **Develop a stable and competitive supplier base**	Build strong, long-term relationships with strategic suppliers and help to develop local suppliers. Provide suppliers with continuous feedback on their performance relative to competitors to drive down costs, and improve quality and service. Where appropriate, help develop capable local and Bumiputera vendors.

(Source: PCG, 2006)

The ePerolehan system attracted several scholars as one of the massive Malaysian e-government technologies. Some scholars investigated the issues and the challenges of this system (Aini and Hasmiah, 2011; Hashim, 2010; Hui et al., 2011; Kassim and Hussin, 2010c). Others, concentrated on the suppliers' side by investigating their readiness (Kaliannan and Awang, 2008; Kaliannan et al., 2010; Salleh, 2009; Salleh and Rohde, 2005) and attitudes toward adoption and use (Kaliannan et al., 2008; Kaliannan et al., 2009b). On the other hand, some scholars focused on the ePerolehan users' side by assessing the system user's acceptance (Rose et al., 2009), government agencies and departments performance (Kassim and Hussin, 2010a), usage and process efficiency (Kassim and Hussin, 2010c; Sambasivan et al., 2010). For instance, in their study, Aini and Hasmiah (2011) find that ePerolehan system has many challenges related to software integration, data management and roll-out strategy, as well as to legal and administration procedures, IT infrastructure, outsourcing contract and IT skills. Sambasivan et al. (2010) designed a model to measure the factors that affect the intention to use along with the actual usage of e-procurement systems in Malaysian departments and agencies. The results reveal that some factors have a direct influence on user's intention to use the system, such as perceived usefulness, perceived ease of use, assurance of service by service providers, responsiveness of service providers, facilitating conditions, and web design. Other factors, such as trust, perceived risk, and web design quality (information) were found to be not significant.

As discussed earlier, researchers investigate several aspects of ePerolehan system as one of Malaysia's e-government systems. However, further investigation are still needed to overcome the issues of the system and its impacts on the performance, such as end-user satisfaction. Therefore, this study is interested in examining the success and effectiveness of ePerolehan system as a public sector system under mandatory use environment. The study will investigate the effectiveness of the system by measuring end-user satisfaction and the factors that influence it from the perspective of "ePerolehan" non-technical end users who are interacting directly with the system and working at the purchasing departments in Malaysian governmental ministries, agencies, and departments. This study is concerned to highlight the e-procurement system qualities that reflect the unique system environment. It is interested in testing the mediating effect of trust between e-procurement system qualities and end user satisfaction.

1.2 RESEARCH QUESTIONS AND OBJECTIVES

The main objectives of this study are: Firstly, to determine the e-procurement system qualities that influence trust and end-user satisfaction. Secondly, to investigate the impact of trust on end-user satisfaction. Thirdly, to examine trust mediating effect between e-procurement system qualities and end-user satisfaction.

In line with the main research objectives, the following detailed objectives are formulated:

1. To examine the impact of e-procurement system qualities on trust and end-user satisfaction.
2. To examine the relationship between e-procurement system qualities.
3. To investigate trust mediating effect between perceived e-procurement quality and end-user satisfaction.
4. To investigate trust mediating effect between perceived order fulfilment quality and end-user satisfaction.
5. To examine the relationship between trust and end-user satisfaction

In consonance with these objectives, the following research questions are examined: **(1)** What are the e-procurement system qualities that influence trust and end-user satisfaction? **(2)** What is the impact of trust on end-user satisfaction? **(3)** Does trust mediate the relationship between e-procurement system qualities and end-user satisfaction?

The proposed research framework aims to investigate the effectiveness and the success of government e-procurement system by measuring direct end-user satisfaction based on IS Success Model (Delone, 2003; DeLone and McLean, 1992). User satisfaction is a recommended measure for system success in mandatory use environment. User satisfaction is proposed to be influenced by e-procurement system qualities which represent the unique environment of e-procurement system. The system qualities are reflecting end user's experiences with the system. These experiences are seen to form end user's belief and "trust" in the system. In addition, the level of user's belief and "trust" in the system is suggested to influence end-user satisfaction.

Figure 1.1 illustrates the research issues under investigation.

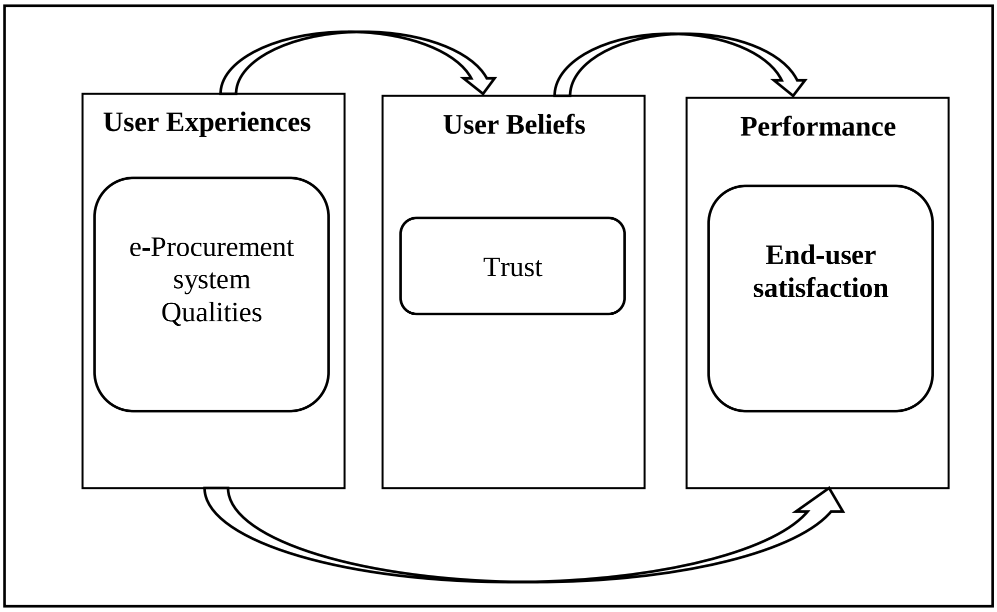


Figure 1.1: Research Issues

The first issue identifies e-procurement system qualities. One aim is to identify e-procurement system qualities that are related to the e-procurement system environment. After the identification of e-procurement system qualities, it is essential to investigate the relationship between different system qualities.

The second issue examines the links between e-procurement system qualities and trust, and between e-procurement system qualities and end-user satisfaction. Several scholars state that system quality enhances system user's trust (Nicolaou and McKnight, 2006; Urban et al., 2009). Thus, the aim of this study is to investigate the effect of e-procurement system qualities on trust. On the other hand, IS scholars highlight the role of system quality on end-user satisfaction (McGill et al., 2003; Zhou, 2013). Therefore, this study aims to investigate the effect of e-procurement system qualities on end-user satisfaction.

The third issue examines the link between trust and end-user satisfaction. User's belief "trust" is seen as a result of system user's acceptance. Thus, it affects system users' attitude i.e "end-user satisfaction" (Kassim et al., 2012; Lu et al., 2012a; Underwood, 2002; Wu and Chen, 2005). Therefore, the aim is to investigate whether system user's trust affects end-user satisfaction.

The fourth issue examines the mediating effect of trust between e-procurement system qualities and end-user satisfaction. In the literature, trust is reported to mediate the relationship between several constructs in several contexts (Geyskens et al., 1999; Kassim et al., 2012). Thus, the aim of this study is to test the role of trust as a mediator between e-procurement system qualities and end-user satisfaction in government e-procurement system context.

1.3 SIGNIFICANCE AND MOTIVATION OF THE STUDY

The significance of performing this research is to evaluate e-procurement system effectiveness by highlighting the main determinants that impact end-user satisfaction. By exploring the previous literature, only few studies are concerned about investigating the determinants that affect e-procurement system end user satisfaction. To bridge our understanding of the determinants that have a great impact on the end user satisfaction, the investigation based on this research is employed to evaluate e-procurement system performance from a system user's perspective. In addition, this study is significant for several reasons:

First, e-procurement studies are crucial, mainly because procurement is among the most vital operations of the supply chain (Novack and Simco, 1991; Quesada et al., 2010). E-procurement is an innovation and it requires good administration to fulfill its objectives (Govindarajan and Trimble, 2010). Trott (2011) states that potential decisions are essential to the success of the usage, depending on the type of innovation.

E-procurement as an innovative promising technology is viewed as a means of a supply chain. However, earlier proof within the literature supports the belief that the insufficient awareness of e-procurement system will certainly result in boosting transaction and management costs, impacts the accuracy and functionality of procurement functions, maximizes the errors, and wastes effort and time (Tatsis et al., 2006).

Second, it is very important to give attention to the public sector. Raymond (2008) states that the main objective of public service agencies is to leverage the whole ‘value for money’ for citizens. Bauld and McGuinness (2006) demonstrate that the value of money in the public sector requires suitable efforts which could enhance and progress government regulations and guidelines in order to reach the most desirable return and performance for the money being invested. The development and management of e-government systems have grown to be significant components of present day public management (Torres et al., 2005). To make sure that e-government is achieving success, it is essential to evaluate its performance, and then to perform needed actions according to these evaluations (Gupta and Jana, 2003). In spite of this, not much is recognized in regards to the value and effectiveness of public online systems (Torres et al., 2005).

Third, usually massive IS investment lies under mandated use by their prospected users. Thus, they require special consideration and awareness. Although previous researchers have realized the difference between voluntary and mandatory technology adoption, there is little research that has thoroughly assessed technological adoption in the mandatory use environment (Chan et al., 2010; Jasperson, 2005). Venkatesh and Brown (2001) point out that mandatory use environment is suffering from the lack of established theoretical system. While the majority of previous research has been conducted in the voluntary adoption context, the usefulness of earlier investigations to the mandatory use context is yet not clear (Chan et al., 2010). Hartwick and Barki (1994) assure that when an organization mandates the use of an IT application, individuals retain considerable discretion regarding their use of the features of the application. Therefore, it is crucial to highlight and investigate the mandatory use environment.

Fourth, system users are the internal customers of any organization, and the organizations must prepare them well and offer them suitable services to increase their productivity. Little (2003) states that fulfilling the needs of external customers is not enough to achieve business success; however, nowadays, offering service quality to internal customers is crucial (Bruhn, 2003). Investigating system performance by evaluating users' satisfaction is very significant. Therefore, according to previous literature, user satisfaction is a crucial determinant of system success and effectiveness (DeLone and McLean, 1992; Thong and Yap, 1996). In other words, an effective system recognized by its users as an unsatisfactory system is in fact an ineffective system (Thong and Yap, 1996). Thus, it is important for organizations to realize internal customer's requirements and expectations by delivering quality internal service and systems (Frost and Kumar, 2000).

Finally, since system quality has long been underlined for being a robust predictor of system effectiveness and performance, it could be beneficial to understand more about the quality dimensions of e-procurement system in particular and their relationship with trust e-procurement system performance. In the literature, little consideration is shown towards the unique environment of the e-procurement system, and thus, towards system qualities dimensions. The adoption and use of e-procurement has been prevalent in supply chain management. Consequently, there is very little research examining the critical role of quality in this context (Vaidyanathan and Devaraj, 2008).

1.4 ORGANIZATION OF THE STUDY

This research is presented in six chapters. The current chapter, ***Chapter 1,*** presents the background of the study, research questions and objectives, the significance and motivation of the study.

Chapter 2: This chapter presents a broad picture of the e-government systems in general and e-procurement systems in particular, incorporating the concepts and definitions of the e-procurement system, and the benefits associated with e-procurement system implementation. Furthermore, the chapter overviews the previous literature, regarding factors that influence e-procurement performance, such as perceived e-procurement quality and perceived supplier's order fulfilment quality and trust.

Chapter 3: It articulates and addresses the research model and the hypotheses to validate and confirm the proposed model.

Chapter 4: This chapter covers the suitable research methodology for this study by discussing research philosophy and research design. In addition, it provides research sample determinations by specifying the targeted population. It also highlights the unit of analysis and suitable sample size. The chapter also presents the research instrument development and its validation process by detailing the steps of developing the measurements and the way that is used to validate them by performing pretesting and pilot study tests. Additionally, it explains the questionnaire design and the way the final instruments are presented to the respondents along with the way the questionnaire is distributed and collected from the targeted respondents. Finally, the chapter assigns the analysis program, which is used to analyze the collected data, and specifies the way the data is analyzed in this study.

Chapter 5: This chapter explains the way the data is analyzed. However, after performing exploratory factor analysis (EFA) by using (SPSS), further analysis is conducted by using Partial Least Square Structural Equation Modeling (PLS-SEM). (PLS-SEM) is used to check the convergent and discriminant validity of the data in addition to the reliability and confirmatory factor analysis (CFA). In addition, the data are assessed by using two models which are provided by (PLS-SEM, namely the measurement model and the structural model. Moderating effects and effect size are taken into consideration. Consequently, the hypotheses are tested and ready for interpretation and discussion.

Chapter 6: This chapter shows the main findings of the study by presenting the discussion of the results. The results are compared with the prior literature outcomes. Research contributions like managerial, theoretical and methodological are outlined. A number of the limitations of the study are also mentioned. Some recommendations are laid out in line with the research results.

CHAPTER 2

LITERATURE REVIEW

"B2B e-commerce will fundamentally restructure the way in which an organization purchases goods, resulting in significant process efficiencies and permanently lower costs"
(Neef, 2001, p. 8)

INTRODUCTION

This chapter provides a review of previous literature that is related to the study area. This Chapter is divided into six sections. In section one, the chapter starts by introducing e-Procurement (eP) concept, definition and benefits. In section two, the chapter provides literature about eGovernment (eG) systems and highlights public procurement context. In section three, the theories underpinning user satisfaction in post implementation stage are explained. In section four, detailed literature on trust is presented. In section five, literature on perceived e-Procurement quality is discussed. Finally, section seven presents the related literature on order fulfilment quality. Chapter summary is provided at the end of the chapter.

2.1 OVERVIEW OF E-PROCUREMENT SYSTEMS

2.1.1 E-procurement Concept and Definition

The Internet has given rise to the digital or network economy in which businesses around the world utilize Internet and e-business technologies (IEBT) to support online or electronic commerce (e-commerce) and electronic business (e-business) activities (Ifinedo, 2011; Zhu et al., 2009). Therefore, Internet and e-business technologies (IEBT) refers to the application and technologies supporting e-commerce and e-business (Ifinedo, 2011) among which e-procurement system is included. Neef (2001) states: “E-procurement is the most important area of development in the B2B e-commerce arena” (Neef, 2001, p. 2). Barua et al. (2001) refer to e-procurement system as “the most important element of e-business operational excellence for large corporations” (Barua et al., 2001, p. 38).

In the field of IS, e-Procurement System is defined in various ways. Davila et al. (2003) popularize the term e-Procurement System to describe technologies that are concentrating on automating procurement processes, strengthening and enhancing business spending capability, and figuring out new sourcing opportunities by using online means. This definition is close to those of Presutti (2003), and Croom and Brandon-Jones (2005) who define e-procurement system as an innovation that is developed to enhance the purchasing functions through the Internet. However, Quesada et al. (2010, p. 518) criticize the idea of defining e-procurement system as internet system innovation, and point out that the erroneous concentration on the internet only may lead scholars to recognize the system functionality and features in a limited way. Nevertheless, they emphasize that e-Procurement system "is not synonymous with internet-procurement" (Quesada et al., 2010, p. 518), but it is electronic procurement (Neef, 2001). Accordingly, in their study, Ordanini et al. (2008) find that the internet could strengthen the outcome of "process integration capability", but not that of "process efficiency capability" (Ordanini and Rubera, 2008, p. 27).

In 2006, Tatsis et al. review e-Procurement System definitions by extracting them from four key studies published over three years (1999-2002), as displayed in Table 2.1. E-Procurement System definitions varied to include eight different concepts: electronic tool, web-based/internet based, technology, process, supply chain integration, procurement management, procurement automation, and procurement optimization. It is clearly revealed that the four studies agree to consider e-Procurement System as a management tool. Whereas, Alaniz and Roberts (1999), Morris et al. (2000) and Aberdeen Group (2001) consider it as a web-based technology. While Alaniz and Roberts (1999) see it as an electronic tool, Morris et al. (2000) as a process, Aberdeen Group (2001) considers it as a supply chain integration. Furthermore, Aberdeen Group (2001) and Chaffey (2002) evolve e-Procurement System definition to include procurement automation and optimization concepts. Obviously all defined concepts represent and reflect the e-Procurement System environment. Thus, it is essential to provide a comprehensive definition for e-Procurement System as the one provided by Tatsis et al. (2006, p. 64) who define e-Procurement System as ‘‘the integration, management, automation, optimization, and enablement of an organization’s procurement process, using electronic tools and technologies, and web-based applications’’.

Procurement is the common expression carried out on the usage of integrated database systems and network communication systems in buying/ procuring processes. The procurement process incorporates several stages : identifying the requirements by a system user, searching for a specific product or service, negotiating with the supplier, placing the order, paying order amount, and receiving the product/service (Croom and Brandon-Jones, 2005). Generally, procurement processes use a variety of technologies and applications, such as e-procurement system, e-business auction, and B2B market exchange (Davila et al., 2003). However, currently, the e-procurement system concept has become interchangeable with electronic marketplaces (Tonkin, 2003).

Table 2.1: Definitions of e-procurement

Source	Definition	Electronic tool	Web-based/ Internet based	Technology	Process	Supply chain integration	Procurement management	Procurement automation	Procurement optimization
Alaniz and Roberts (1999)	‘‘E-procurement refers to Internet solutions that facilitate corporate purchasing’’	√	√	√			√		
Morris et al. (2000)	‘‘E-procurement is a series of steps—from the formulation of the purchasing corporate strategy to the actual implementation of an Internet-based purchasing system’’		√	√	√		√		
Aberdeen Group (2001)	‘‘E-procurement is the creation of private, web-based procurement markets that automate communications, transactions and collaboration between supply chain partners. It is about enhancing collaborations, streamlining processes, controlling costs, and enhancing information exchange within and across organization boundaries’’		√	√		√	√	√	√
Chaffey (2002)	‘‘E-Procurement should be directed at improving performance for each of the ‘‘five rights’’ of purchasing, which are sourcing items: at the right price, delivered at the right time, are of the right quality, are of the right quantity, from the right source’’						√	√	√

(Source: Tatsis et al., 2006)

2.1.2 E-procurement Benefits

The popularity of e-Procurement System practices is increased due to its huge benefits. Referring to e-Procurement Systems literature, many studies provide evidence of the benefits of implementing e-Procurement System and its impact on the organizations. The success of e-Procurement System implementation has several indicators, namely returning to investment, higher organizational performance, outcome quality, user satisfaction, and continual usage by organizational employees (Díez and McIntosh, 2009). E-Procurement System is a cost-effective technology which leverages the social capital, and, as a consequence, it improves public trust (Hsiao and Teo, 2005). Recently, e-Procurement System is considered as a significant means in business. It improves communication between buyer and suppliers, reduces transaction and administration costs, provides wider base of buyers and suppliers, improves delivery and logistic functions, and reduces paper-base work (Gunasekaran and Ngai, 2008; Hsiao and Teo, 2005). E-procurement systems enable organizations to locate products and new sources of supply that can provide products and services at lower prices, and to streamline the ordering process to obtain significant efficiencies (Mishra et al., 2007). Many firms experienced e-Procurement Systems and, due to its efficiency and effectiveness, most of them are satisfied with its performance (Rask and Kragh, 2004). Moreover, many organizations consider procurement functions as strategic levels that lead to gain competitive advantage (Hunter et al., 2006). In addition, the revolution of e-Procurement Systems is supposed to leverage and improve the status of the purchasing function in businesses (Croom, 2000).

Several scholars mentioned that a variety of IS applications contribute to the advancement of supply chain management such as, electronic data interchange (EDI), inter-organizational systems, e-commerce, e-sourcing, e-procurement, and e-auctions (Kameshwaran et al., 2007; Presutti, 2003). Therefore, e-procurement systems are signified as an essential improvement for the purchasing process (Neef, 2001) by providing positive aspects to the business via purchase processes, efficiency, benefits, and cost cutbacks (Croom, 2000). Tan (2001) acknowledges that the advancements in supply chain management nowadays are due to adoption of e-business systems. Thus, the adoption of such technology has an impact on : cost efficiency, customer service (service quality), process capability, productivity and dependability.

The key reasons that direct a business to adopt e-procurement system strategy vary depending on the kind of relationship established among a business along with its suppliers and customers. These reasons can be viewed as catalysts to e-business systems. The most important reasons are the quantity of suppliers, product sophistication, design sophistication and quantity of product codes for suppliers (Muffatto and Payaro, 2004). When the sophistication of such factors increases, the sophistication of the relationship between the business and its suppliers will increase as well (Muffatto and Payaro, 2004). Numerous studies mention the potential benefits associated with e-procurement. Croom (2000) points out four key advantages. First, to reduce purchase process cost. Second, to improve and control expenditure. Third, to enhance procurement control. Finally, to gain advantage from administering suppliers. Tatsis et al. (2006) categorize the benefits of e-Procurement Systems into seven main categories, namely minimizing prices, decreasing administrative costs, inventory reduction, lessen order cycle times, enhanced communication exchange and information transfer, better planning and controlling, and evolving cooperation with suppliers.

2.2 ELECTRONIC GOVERNMENT

"We should be careful not to underestimate the effect that government endorsement and participation of e-procurement can mean to both the industry and to the economy"
(Neef, 2001, p. 109)

E-government is defined by Wang and Liao (2008, p. 718) as “a government's use of ICT, particularly Web-based Internet applications, to enhance the access to and delivery of government information and service to citizens, business partners, employees, and other agencies and entities.” The majority of national governments and large numbers of local governments have founded online websites wherein they offer e-government services (Norris and Curtice, 2006). E-government has become a global phenomenon technology that supports the public sector by improving the delivered services and enhancing the efficiency of e-government (Banerjee and Chau, 2004; Lu et al., 2012b).

Many governments have noticed the significance of utilizing information and communication technologies (ICT) to deliver effective and transparent government (Prattipati, 2003). Thus, in the last two decades, governments began operating e-government developments geared toward delivering electronic information and services to individuals as well as businesses (Torres et al., 2005). The development of e-government websites increased dramatically from 8.7% in 1995, 40% in 1998, 87.3% in 2000, and exceeded 90% by 2003 as cited by Holden et al. (2003).

The adoption of e-government systems has attracted many scholars, and is considered to represent the most major IT implementation and business change challenges of the following years (Marche and McNiven, 2003; Warkentin et al., 2002). One of the main criticisms of the present e-government studies is that they suffer from insufficient theoretical and methodological rigor. The criticisms are mostly based on ideas and viewpoint with no endeavor created to discover theoretical range and rigor in current e-government study (Rana et al., 2011). In spite of this, little is recognized in regards to the success and effectiveness of public online systems (Torres et al., 2005). Therefore, to make sure that e-government is achieving success, it is essential to evaluate its effectiveness, where a suitable reaction will be based on these evaluations (Gupta and Jana, 2003).

One can find four common forms of e-government systems and services : Government to Government (G2G), Government to Citizen (G2C), Government to Business (G2B) (Siau and Long, 2009; Wang and Liao, 2008), and Government to Employees (G2E) (Siau and Long, 2009). Extensively, G2B service entails all the interaction or transactions between government and businesses. The main focus of this research is on G2B systems.

2.2.1 Electronic government procurement

Wide range of global public sector agencies have acknowledged e-procurement system as a main concern of e-government agenda and have employed or are in the process of employing e-procurement systems (Vaidya et al., 2006). E-procurement system is one of the main technologies which are adopted by the majority of governments, and is known as Government Electronic Procurement (government e-procurement) (Kassim and Hussin, 2010b; Salleh, 2009). Government e-procurement is defined by the World Bank as “the use of Information & Communication Technology (ICT), especially the Internet, by governments in conducting their relationships with suppliers for the acquisition of works, goods, and consultancy services required by the public sector" as cited by Leipold (2004, p. 3).

According to the World Bank, as cited by Leipold (2004), the implementation of government e-procurement consists of three standard levels :

- Online disclosure of information (e.g., publication of procurement notices, awarded contracts, and procurement law & regulations).
- Online procurement transactions (e.g., electronic distribution of bidding documents and RFP/RFQ documents, electronic submission of bids/proposals/quotations, electronic bid opening).
- Online procurement integration (e.g., integration of government e-procurement with systems for financial management, tax administration, and others).

Much like conventional tendering and purchasing procedures, government e-procurement can be broken into e-Tendering and e-Purchasing. E-Tendering is created to electronically manage the procedure of public tender for the purchase of specific functions, products, and services that are of quality value and low quantity. E-Purchasing is created to electronically assist in the purchase of low price and large quantity of regular products or services.

2.2.2 Public Procurement

Public procurement is an essential function of federal government (Thai, 2001). It is required to fulfill necessities for products, functions, systems and services in a timely manner (Vaidya et al., 2006). As cited by Tukamuhabwa (2012), the World Bank (1995) defined public procurement as the use of public funds to purchase products and services. Roodhooft and Abbeele (2006) outline that public organizations have invariably been massive buyers, working with enormous financial budgets. Public sector procurement is huge and sophisticated, accounting for between 20-30% of gross domestic product (GDP) (Thai and Grimm, 2000). Mahmood (2010) also mentions that public procurement spends 18.42% of the world GDP. Moreover, enormous amount of money comes from the public to be involved in government procurement. Therefore, it demands for accountability and transparency (Hui et al., 2011). Governments are using public procurement to protect public interest (Rasheed, 2004). Public procurement offers exceptional bargaining power and opportune costs (Globerman and Vining, 1996).

As a result, several nations around the world, either in developed or in the least developed countries, have implemented procurement changes, including laws and regulations (Tukamuhabwa, 2012). The actual main hurdle, however, is actually insufficient regulatory compliance (Gelderman et al., 2006). Boer and Telgen (1998) assure that non-compliance dilemma impacts undeveloped countries as well as developed countries. In their research, Hui et al. (2011) investigate procurement issues in Malaysia. One of the evolved issues in their study is the non-compliance of procurement officers with the policies and procedures of the procurement system.

The dilemma of public procurement non-compliance has recently several debates (Boer and Telgen, 1998; Eyaa and Oluka, 2011; Gelderman et al., 2006). Notwithstanding, Karjalainen et al. (2009) claim that not much studies have been carried out on organizational misbehaviors and non-compliance in procurement and supply chain management. Recently, Tukamuhabwa (2012) developed a comprehensive conceptual framework of the antecedents and consequences of compliance and non-compliance with public procurement by referring to the previous literature. In their study they propose twelve antecedents and five consequences. They assigned media publicity, enforcement, records management, organizational culture, political interference, professionalism, organizational incentives, perceived rule legitimacy, moral obligation, social influence, familiarity with rules, and top management support to be antecedents, while cognitive dissonance, low employee motivation, low corruption, better corporate governance, and low service delivery were identified as consequences of public procurement compliance.

Kassim and Hussin (2010a) point out that G2B is one of the public sector inter-organizational system that appear as an important component of e-government systems. Moreover, G2B systems improve the service quality between government and public business (Kassim and Hussin, 2010a). Siau and Long (2009) state that the main objectives of G2B environment are to improve businesses service and to minimize the buying cost of government by utilizing e-business technology.

There are various kinds of G2B systems. One of them is an independent system where government agencies work as one user. Another kind is an interdependent system which needs communication among government agencies, departments, and business users. This type is considered complex due to the great number of system users. Thus it is controlled by formal rules and regulations which are imposed by Ministry of Finance (Kassim and Hussin, 2010c).

2.3 OVERVIEW OF SATISFACTION

Global happiness or overall satisfaction with life is known as the net outcome of reported satisfaction with major domains of life including financial situation, family life, work situation, and so on. Satisfaction in every life domain is viewed as reflecting the degree to which objective outcomes in that domain match the person’s objectives or desire in that area. However, satisfaction may vary with changes in goals, objective conditions, or both (Easterlin and Sawangfa, 2007). As Tatarkiewicz et al. (1976, p. 8) wrote, "happiness requires total satisfaction, that is satisfactions with life as a whole."

Global life satisfaction refers to the global judgment by individuals on their life experience in general, and is an essential element of well-being (Diener et al., 1985; Pilar Matud et al., 2014). Shin and Johnson (1978, p. 478) define life satisfaction as "a global assessment of a person's quality of Life according to his chosen criteria". According to Diener (1995, p. 653) “Subjective well-being is a person’s evaluative reactions to his or her life - either in terms of life satisfaction (cognitive evaluations) or affect (ongoing emotional reactions)”. The individual’s judgment is significant in the investigation of individual well-being, and in the assessment of the quality of life of societies (Diener et al., 2013). Subjective well-being has been associated with variables such as health, social contact, activity, and personality (Diener, 1984). Individual variations in life satisfaction are actually explained by different variables and two basic theoretical accounts have been recognized. The first theoretical account includes top-down approaches, which point out the role of personological variables, whereas the second one includes bottom-up approaches, that focus on the role of situations, events, and contexts (Heller et al., 2004). According to life satisfaction theory, what’s good for a person is to be satisfied with the conditions of the life overall. Thus, life satisfaction is seen as a feeling that is more significant than some pleasures (Tiberius, 2014).

Job satisfaction is one of the life domains. According to Locke (1976, p. 1300) ‘‘job satisfaction is a pleasurable or positive emotional state resulting from an appraisal of one’s job or job experiences’’. Although job satisfaction has been defined as an emotional state, like individuals’ satisfaction with other life domains (e.g., marital satisfaction), job satisfaction is an attitudinal construct exhibiting one’s assessment of his or her job (Ilies and Judge, 2004). Job satisfaction is seen as an attitude toward the job, that is, “a positive (or negative) evaluative judgment one makes about one's job” (Weiss, 2002, p. 175). It is based on cognitions about the job and affects experience at work. Several studies have shown that job satisfaction is anticipated simultaneously by both cognitive and affective determinants (Ilies and Judge, 2004; Weiss et al., 1999). Based on value-percept theory by Locke (1969), job satisfaction is seen as a function of what one needs from a job and what one perceives oneself as receiving (what one believes his or her job provides). It gets noticeable that job beliefs should have a direct positive influence on job satisfaction.

From business and organizational perspectives, customer's satisfaction is one of the most important research topic in the business as well as e-business (Au et al., 2008; Deng et al., 2010; Kobylanski et al., 2011; Leuschner et al., 2012; Sheng and Liu, 2010). Customer's satisfaction, which refers to ''the summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience'' (Oliver, 1981, p. 27), is often considered as an important determinant of repurchase intention (Liao et al., 2009) and customer loyalty (Eggert and Ulaga, 2002).

Several researchers measure system performance by measuring user satisfaction (Ainin et al., 2012; Chan et al., 2010; Chen, 2010; Floropoulos et al., 2010). User satisfaction is a surrogate of performance (Ives et al., 1983). User satisfaction is one of the well-known concepts in organizational psychology and researchers have defined this concept in various ways. Ives et al. (1983) define user satisfaction as the extent to which users realize that the information system in use fulfills their work needs. In 1988, Doll described user satisfaction as referring to ''the affective attitude towards a specific computer application by someone who interacts with the application directly'' (Doll and Torkzadeh, 1988, p. 261). Wang et al. (2008) describe it as post-consumption evaluations of the information technology. Au et al. (2008) define user satisfaction as the sum of experiences that the user acquired from his interaction with technology over time and represent users' cognitive evaluation of the entire IS user's experience. An underlying concept in this definition about satisfaction is that it is a method of evaluative reaction or a collective outcome from the perceptions of information systems users (Lilien et al., 2004). Overall, information system literature generally agrees that satisfaction in a given situation is referring to sum of feelings or attitudes (Galletta and Lederer, 1989), need fulfilment (Gelderman, 1998), positive emotion, felt need, system acceptance, perceived usefulness, MIS appreciation, perceptions, and beliefs (Ives et al., 1983; Swanson, 1982; Thong and Yap, 1996).

From the previous definitions, the majority of scholars state that user satisfaction can be viewed as the attitude of the system users (Wixom and Todd, 2005), and it offers a subjective evaluation of IS outcomes (Thong and Yap, 1996). Attitude refers to a positive or negative subjective feeling of the users toward the system (Lu et al., 2012b). Lee (2007) looks at satisfaction as attitude and emotions. Bergersen (2004) associates attitude to satisfaction and claims that end-user satisfaction is an individual's attitude toward the use of an information system. In contrast, Hunt (1977) states that attitude and satisfaction are different concepts. Hence, attitude is an emotion or feeling, but that satisfaction is an assessment of that emotion or feeling. Thus, the user may have a pleasant experience but still feel dissatisfied if the system does not meet his or her expectation level. LaTour and Peat (1979) argue that attitude is a pre-decision assessment, while satisfaction is a post-decision assessment. Anderson et al. (1994, p. 245) view satisfaction as ‘‘post-consumption evaluation of perceived quality.’’

This present research adopts the user satisfaction definition introduced by Au et al. (2008, p. 46), where it is defined as “IS end-user’s overall affective and cognitive evaluation of the pleasurable level of consumption-related fulfilment experienced with the IS.”

In e-government mandatory environment context in China, Lu et al. (2012b) investigate the impact of perceived value on e-government customer’s satisfaction. In addition, they examine the influence of perceived security and perceived fit on perceived value construct. The authors collected the data from 136 users of the Golden Tax Project in China. They analyzed the data by using (PLS-SEM). The research outcomes provide empirical evidence that the perceived system value has positive and significant impact on e-government customer satisfaction. Also, the perceived security and perceived fit have positive and significant impact on perceived value, in addition to the positive indirect effect on e-government customer's satisfaction through the mediation of perceived value.

Many scholars mention that user satisfaction is among the major factors ultimately causing information systems (IS) success (Delone, 2003; DeLone and McLean, 1992; Keramati and Salehi, 2013; Lu et al., 2012b). However, the factors which lead to the recognition of user's requirements and therefore satisfaction are often confusing to identify because of their complicated inter-relationship (Adam Mahmood et al., 2000). Ditsa and MacGregor (1995, p. 196) identify seven models which pertain to user satisfaction and use, namely: quality of the information from the IS; user's interface features of the IS; support provided by DP staff, vendors or manuals; effectiveness of the IS in the organization; involvement of the user in the planning; development and implementation of the IS; involvement of management in the planning; development and implementation of the IS and finally the user's attitudes toward the IS.

Adam Mahmood et al. (2000) perform a meta-analysis to identify determinants of user satisfaction by examining the outcomes of 45 previous empirical studies over the last 12 years (1986-1998). They concentrate on relationships between end-user satisfaction and nine variables : perceived usefulness, ease of use, user's expectations, user's experience, user's skills, user's involvement in system development, organizational support, perceived attitude of top management toward the project, and user's attitude toward information systems (IS) in widely divergent settings. The finding of the study show positive support for the influence of all nine factors on user satisfaction, but to distinct levels only. In addition, the study finds out that the most significant relationships are the user's involvement in systems development, perceived usefulness, user's experience, organizational support, and user's attitude toward the IS, as presented in Figure 2.1.

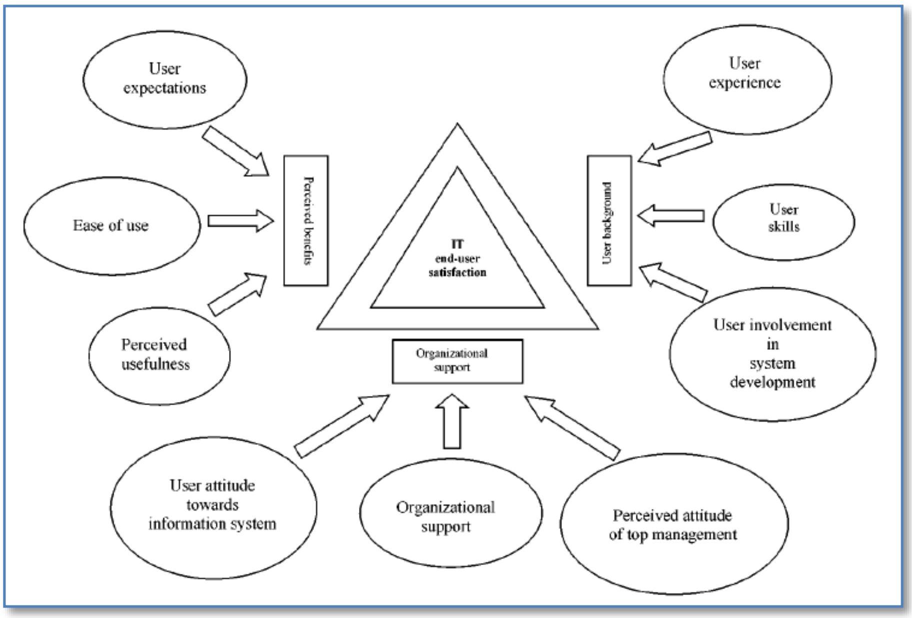


Figure 2.1: Research Model of Factors Affecting IT end-user satisfaction (Source: Adam Mahmood et al., 2000, p. 753)

Similarly, Au et al. (2002) conduct a critical review of research in end-user's information system satisfaction (EUISS) by analyzing 50 published articles. The analysis finds out that the previous research focuses on the Expectation-Confirmation Theory (ECT). Thus they recommend the use of integrated conceptual model based on other theories, such as the equity and needs theories.

Based on the literature, there is no consensus agreement about the factors that influence end-user satisfaction. Several empirical studies have been conducted during recent years to measure the factors that affect end-user satisfaction. However, to our knowledge, none of the current literature reviews analyzes the content of articles, published after 2003, related to user satisfaction subject. Consequently, user satisfaction subject is left with a knowledge gap in publications released from 2003 onwards. Therefore, it is worthwhile to fulfill this gap by reviewing recent literature and analyzing its content. For that reason, this study conducts a review by performing content analysis that aimes to analyze the current literature to answer the following questions:

- *What are the factors/antecedents that empirically affect end-user system satisfaction?*
- *Under which systems/applications user satisfaction has been evaluated?*
- *What is the usage environment of the evaluated systems?*
- *What are the main theories used in user satisfaction studies?*

In order to achieve an overview of user satisfaction research field to answer our main questions, the data is collected by conducting a wide-ranging search of several databases that provide several leading journals in information systems and business management fields such as *Emerald, ScienceDirect, EBSCO* and *ProQuest.* The type of the publication that are included in content analysis is limited to Academic journal publications and conference proceedings that are published in the period (2003-2014).

Keywords selected for this search are in fact limited to user satisfaction under IT/IS discipline, since the main aim of this analysis is to identify the factors that affect user satisfaction, regardless of IT/IS being used. In order to generate the relevant articles, several combinations of the keywords are used and searched in the fields of article title, abstract and keywords. For instance:

- Satisfaction AND Information System OR Technology
- Satisfaction AND Application OR Software

Selecting the publication for inclusion in the analysis is mostly based on the researcher's choice after viewing the article title and abstract. At the beginning, 95 articles were selected and downloaded based on their titles, abstracts, and keywords. Finally, only 71 articles are included in content analysis. The content of the articles is reviewed, and the data related to the previous specified taxonomies is extracted for further analysis.

Based on the main objective of content analysis, which is to identify the main factors that influence end-user satisfaction in the publications which are evaluated empirically, the results show that the previous publications evaluated the relationship between around 45 factors for user satisfaction. After analyzing the publications, we find that (44%) of the publications evaluate 'Information Quality', while (39%) of the publications assess 'System Quality', followed by (32%) which test 'Perceived Usefulness' and (27%) evaluate 'Service Quality'. Table 2.2 displays the main 9 factors that are found to influence user satisfaction. From the findings, it becomes obvious that system qualities have a significant effect on system user satisfaction. For instance, 31 studies evaluate the effect of information quality on user satisfaction, 26 of them report a significant relationship with user satisfaction and the remaining 5 studies report non-significant relationship. Similarly, 28 studies assess the influence of system quality on end-user satisfaction while 20 studies report a significant relationship. However, the rest do not report significant relationship between the constructs. This indicates that there is no consensus agreement in the studies about the effects of some factors on user satisfaction.

Table 2.2: Factors Influencing User Satisfaction

No.	Factors	%	Data Sources
1	**Information Quality**	**44%**	Chang et al. (2003), Negash et al. (2003), Wu and Wang (2006), Lee et al. (2007a), Cheung and Lee (2008), Wang and Liao (2008), Jin et al. (2009), Adeyinka and Mutula (2010), Chen (2010), Floropoulos et al. (2010), Kang and Lee (2010), Alshare et al. (2011), Petter and Fruhling (2011), Wang and Chiu (2011), Ya-Yueh (2011), Aggelidis and Chatzoglou (2012), Ainin et al. (2012), Lee and Yu (2012), Zheng et al. (2012), Balaban et al. (2013), Chen et al. (2013), Chou and Hong (2013), Garcia-Smith and Effken (2013), Lee et al. (2007b), Chiu et al. (2007), De Wulf et al. (2006), Zhou (2013), McGill et al. (2003), Bharati and Chaudhury (2004), Klobas and McGill (2010), Dwivedi et al. (2013)
2	**System Quality**	**39%**	Negash et al. (2003), Wu and Wang (2006), Lee et al. (2007a), Cheung and Lee (2008), Wang and Liao (2008), Adeyinka and Mutula (2010), Chen (2010), Floropoulos et al. (2010), Kang and Lee (2010), Alshare et al. (2011), Petter and Fruhling (2011), Wang and Chiu (2011), Ya-Yueh (2011), Aggelidis and Chatzoglou (2012), Ainin et al. (2012), Lee and Yu (2012), Udo et al. (2012), Zheng et al. (2012), Balaban et al. (2013), Chen et al. (2013), Chou and Hong (2013), Chiu et al. (2007), McGill and Klobas (2005), Zhou (2013), McGill et al. (2003), Bharati and Chaudhury (2004), Klobas and McGill (2010), Dwivedi et al. (2013)
3	**Perceived Usefulness**	**32%**	Calisir and Calisir (2004), Chu et al. (2004), Avlonitis and Panagopoulos (2005), Konradt et al. (2006), Thong et al. (2006), Kim and Chang (2007), Lee and Park (2008), Sørebø and Eikebrokk (2008), Jin et al. (2009), Lai et al. (2009), Larsen et al. (2009), Rouibah et al. (2009), Floropoulos et al. (2010), Kang and Lee (2010), Kim (2010), Kanthawongs (2011b), Ainin et al. (2012), Chen (2012), Kim (2012), Son et al. (2012). Udo et al. (2012), Lim et al. (2013), Al-hawari and Mouakket (2010)
4	**Service Quality**	**27%**	Negash et al. (2003), Lee et al. (2007a), Wang and Liao (2008), Adeyinka and Mutula (2010), Chen (2010), Floropoulos et al. (2010), Petter and Fruhling (2011), Wang and Chiu (2011), Ya-Yueh (2011), Ainin et al. (2012), Lee and Yu (2012), Balaban et al. (2013), Chen et al. (2013), Chou and Hong (2013), Bienstock and Royne (2010), Chiu et al. (2007), Zhou (2013), Klobas and McGill (2010), Dwivedi et al. (2013)
5	**Perceived Ease of Use**	**21%**	Chu et al. (2004), Avlonitis and Panagopoulos (2005), Konradt et al. (2006), Thong et al. (2006), Kim and Chang (2007), Lee and Park (2008), Sørebø and Eikebrokk (2008), Lai et al. (2009), Rouibah et al. (2009), Kanthawongs (2011b), Chen (2012), Son et al. (2012), Udo et al. (2012), Lee et al. (2007b), Al-hawari and Mouakket (2010)
6	**System Use/ Utilization**	**17%**	Wang and Liao (2008), Larsen et al. (2009), Rouibah et al. (2009), Kassim and Hussin (2010c), Alshare et al. (2011), Hou (2012), Zamzuri et al. (2012), Balaban et al. (2013), Chou and Hong (2013), Chiu et al. (2007), Klobas and McGill (2010), Dwivedi et al. (2013)
7	**Support/ Training**	**10%**	Gyeung-Min and Eui Shin (2008), Rouibah et al. (2009), Tarafdar et al. (2010), Lee et al. (2011), Aggelidis and Chatzoglou (2012), Lee et al. (2007b)
8	**Enjoyment/ Pleasure**	**8%**	Thong et al. (2006), Kang and Lee (2010), Kim (2010), Kim (2012), De Wulf et al. (2006), Al-hawari and Mouakket (2010)
9	**Benefits/ Value**	**8%**	Wu and Wang (2006), Au et al. (2008), Lee et al. (2011), Lu et al. (2012b), Zheng et al. (2012), Balaban et al. (2013)

Factors that are not listed in the Table 2.2, related to user satisfaction that are tested a few times in the chosen publications are: user's involvement and engagement (Kanthawongs, 2011a; Lim et al., 2013; Rouibah et al., 2009; Tarafdar et al., 2010), map and information presentation (Bharati and Chaudhury, 2004; De Wulf et al., 2006; Lai et al., 2009), strain (Konradt et al., 2006), techno-stress (Tarafdar et al., 2010), loss of control (Lee and Park, 2008), performance expectancy (Chan et al., 2010; Chang et al., 2011; Wu et al., 2010), attitude (Eastman et al., 2011; Kanthawongs, 2011b; Kanthawongs and Saengbanchang, 2011), effectiveness and efficiency (Gudigantala et al., 2011; Lee et al., 2007b; Sheng and Liu, 2010), security (Gyeung-Min and Eui Shin, 2008), risk (Lee et al., 2007b), privacy (Sheng and Liu, 2010), accuracy (Chu et al., 2004; Gudigantala et al., 2011), design feature (Al-hawari and Mouakket, 2010; De Wulf et al., 2006), perceived IS performance (Au et al., 2008; Garcia-Smith and Effken, 2013), perceived credibility (Gyeung-Min and Eui Shin, 2008; Jin et al., 2009), self-regulated (Adeyinka and Mutula, 2010), management learning (Alshare et al., 2011), facilitating conditions (Chan et al., 2010; Garcia-Smith and Effken, 2013), perceived fees (Kim, 2010), perceived price (Lee et al., 2007b), perceived self-efficacy (Alshare et al., 2011; Chang et al., 2011), commitment (Kanthawongs, 2011b; Kanthawongs and Saengbanchang, 2011), perceived interaction (Chen, 2012), flow (Zhou, 2013), perceived fit (Lin, 2012; Lu et al., 2012b), learnability (Calisir and Calisir, 2004), personalization (Lai et al., 2009), top management support (Rouibah et al., 2009), teaching and learning quality (Adeyinka and Mutula, 2010), effort expectancy (Chan et al., 2010), social influence (Chan et al., 2010), motivation (Kanthawongs and Saengbanchang, 2011), communication quality (Wang and Chiu, 2011), trust (Kassim et al., 2012), use dependency (Garcia-Smith and Effken, 2013), customer service and maintenance (Lee et al., 2007b), acceptability (Gyeung-Min and Eui Shin, 2008), currency (up-to-date) (Gyeung-Min and Eui Shin, 2008), learning climate (Wu et al., 2010), accessibility (Sheng and Liu, 2010), fulfilment requirement (Sheng and Liu, 2010).

Various systems/applications are used to evaluate the factors that influence end user satisfaction. Table 2.3 summarizes the major types of systems/applications that are evaluated in the selected publications. However, for the purpose of shortening the IS applications list, the researcher classifies some specified applications under general categories (e.g., Social Networks, Virtual Communities, Social media are classified under Social Networks(Wu et al., 2010).

Based on Table 2.3, the results show that user satisfaction assessment under virtual learning systems is given most attention in the last 10 years. EGovernment systems come in the second order. The reasons behind that are evolution, availability, and relevance of this kind of application. Furthermore, the importance of virtual learning and e-government applications appears from their huge base of users. For instance, e-government applications can be accessed by citizens, vendors, business, and other governments, although, students and lecturers form a huge base of users to eLearning systems. Furthermore, web-based and mobile applications was found to receive attention from scholars in the previous years.

Another outcome that deserves mention is the usage environment of IS applications. From the selected articles, it is found that the usage environment is rarely declared. Hence, out of 71 published articles only 20 publications (28%) state the usage environment, whilst 8 IS applications are reported under the voluntary use environment and 12 under the mandatory use environment.

Table 2.3: The Frequency of evaluating IS Applications

IS Applications	Count	Data Sources
Virtual Learning	12	(Larsen et al., 2009), (Adeyinka and Mutula, 2010), (Alshare et al., 2011), (Wang and Chiu, 2011), (Chen, 2012), (Kassim et al., 2012), (Lin, 2012), (Zamzuri et al., 2012), (Chiu et al., 2007), (Klobas and McGill, 2010), (Al-hawari and Mouakket, 2010), (Wu et al., 2010)
E-government Systems	9	Chu et al. (2004), Wang and Liao (2008), Chan et al. (2010), Chen (2010), Floropoulos et al. (2010), Kassim and Hussin (2010c), Kanthawongs (2011a), Ainin et al. (2012), Lu et al. (2012b)
Web-based Systems	6	Au et al. (2008), Cheung and Lee (2008), Gudigantala et al. (2011), Kanthawongs (2011b), Kanthawongs and Saengbanchang (2011), Bharati and Chaudhury (2004)
Mobile Systems (MS)	6	Thong et al. (2006), Lee and Park (2008), Kim (2010), Kim (2012), Son et al. (2012), Zhou (2013)
eService Systems	4	Negash et al. (2003), Avlonitis and Panagopoulos (2005), Konradt et al. (2006), Udo et al. (2012)
Health/Clinical systems	4	Kim and Chang (2007), Petter and Fruhling (2011), Aggelidis and Chatzoglou (2012), Garcia-Smith and Effken (2013)
Application Service Provider System (ASP)	3	Jin et al. (2009), Zheng et al. (2012), Lim et al. (2013)
Social Networks (SN)	3	Jin et al. (2009), Zheng et al. (2012), Lim et al. (2013)
eBusiness	3	Chang et al. (2011), Chen et al. (2013), Sheng and Liu (2010)

Content analysis findings show that some factors that influence user satisfaction are chosen by scholars according to their relevance to the nature of IS application. For instance, ‘Teaching and Learning Quality’ and ‘Learning Fairness’, which are evaluated only in e-learning context, are not applicable to be measured in some other contexts, like e-government systems.

Based on the selected publications, the major theories that are found to underpin user satisfaction studies are : IS Success Model (Adeyinka and Mutula, 2010; Alshare et al., 2011 ; Chen, 2010 ; Floropoulos et al., 2010 ; Gyeung-Min and Eui Shin, 2008 ; Kassim and Hussin, 2010c; Lee et al., 2011 ; Petter and Fruhling, 2011; Rouibah et al., 2009 ; Wang and Liao, 2008) and Technology Acceptance Model (Al-hawari and Mouakket, 2010 ; Bienstock and Royne, 2010 ; Lim et al., 2013; Lu et al., 2012b ; Son et al., 2012 ; Udo et al., 2012). The results report that the preferred underpinning theory for measuring user satisfaction is the IS success model which is introduced by DeLone and McLean (1992). 32 publications use the IS success model as a single theory, while 8 publications integrate IS success model with other theories, such as technology acceptance model (Avlonitis and Panagopoulos, 2005; Kang and Lee, 2010; Zheng et al., 2012) and social cognitive theory (Chang et al., 2011). On the other hand, popularity of technology acceptance model appears to be obvious when 10 publications adopt it as a single theory and integrate it with other theories in other 10 publications. Furthermore, expectation-confirmation theory is studied in 8 publications; 4 of them as a single theory (Kim, 2012; Seo and Warman, 2011; Sheng and Liu, 2010; Sørebø and Eikebrokk, 2008), and the rest of the theories base on the context of the study. For example, Chiu et al. (2007) use IS success model and fairness theory to evaluate the e-learning system, whereas Chang et al. (2011) adopt the IS success model along with social cognitive theory to evaluate the eBusiness context.

One can conclude from this content analysis that assessing end-user satisfaction as an indicator of system performance is essential and a required measure in our actual time. Most importantly, the content analysis finding shows that system qualities are crucial in influencing user satisfaction construct (Brady et al., 2002; Zheng et al., 2012; Zhou, 2013). However, there is no consensus about the causal effect between quality measure and user satisfaction. Furthermore, there is a need for reassessing and evaluating other factors that do not receive much attention in previous literature (e.g., trust). Moreover, there are many important IS applications that are overlooked in the last decade (e.g., Business-to-Business, Government-to-Business). In the last ten years, IS success model is the suitable model to measure user satisfaction. Therefore, this study will evaluate system qualities and trust in Government-to-Business G2B e-procurement system under mandatory use based on IS success model.

2.3.1 Theoretical Background

Among the various measures of IS performance evaluation, end-user satisfaction is among the most popular (DeLone and McLean, 1992; Thong and Yap, 1996). Ives et al. (1983) identify user satisfaction as a surrogate measure of system performance. Accordingly, an effective system recognized by its users as an undesirable system is in fact an unsatisfactory system (Doll and Torkzadeh, 1988; Ives et al., 1983; Thong and Yap, 1996). In other words, satisfied users will accomplish their work much better than users with poor or neutral attitudes toward the system (Bailey and Pearson, 1983). Nah et al. (2004) point out that user's acceptance doesn't indicate that there is no user's reluctance for compulsory IS. Some users show their resistance to the system by underutilizing it (Kim and Kankanhalli, 2009) or by delaying or obstructing the implementation (Leonard-Barton, 1988).

In post-implementation success, the previous study by Díez and McIntosh (2009) points out that user satisfaction is the sole ideal predictor. User satisfaction mainly is assessed by different subsets of beliefs regarding to particular system, information, and other associated features (Wixom and Todd, 2005). Therefore, the ability to evaluate end user satisfaction functions as a concrete surrogate measure of the performance of IS functions, services, and applications implemented within an organization (Ives et al., 1983) including e-procurement system. User satisfaction has an exclusive and essentially critical role in evaluating system success in mandatory contexts (Brown et al., 2002).

End-user satisfaction has long been researched in several contexts and acknowledged as a crucial concept in IS research that reflects the measuring of success and use of information systems (McKinney and Yoon, 2002). In IS context, two main theories adopt the evaluation of user satisfaction under post-implementation stage. They are IS success model (DeLone and McLean, 1992), and expectation–confirmation theory (Oliver, 1980).

2.3.1.1 The IS Success Model

The original DeLone and McLean's IS success model signifies one of the first efforts to adequately determine and assess IS success (DeLone and McLean, 1992). The IS success model is designed based on an extensive review and synthesis of IS success literature. The IS success model comprises six connected dimensions of information system success: system quality, information quality, use, user satisfaction, individual impact, and organization impact. The model provides a sharp framework for classifying a variety of IS success measures and suggestes interrelationship between the six dimensions. Their model, shown in Figure 2.2, is a substantial advancement in modeling information system success, mainly because it combines a field that had, up until this time, been fragmented in its approach. Additionally, it represents user satisfaction as a dependent variable and supposes system quality and information quality as its antecedents. As a result of the remarkable effect of the Internet on business functions, the IS success model is also updated, and is used to determine e-commerce system success (Delone, 2003). Service quality is included in the model to reflect the IS support, while net benefits substitute impacts since they represent the balance of positive and negative impacts of the IS. In addition, they represent attitude by intention to use a construct and represent behavior by use of construct, as shown in Figure 2.3.

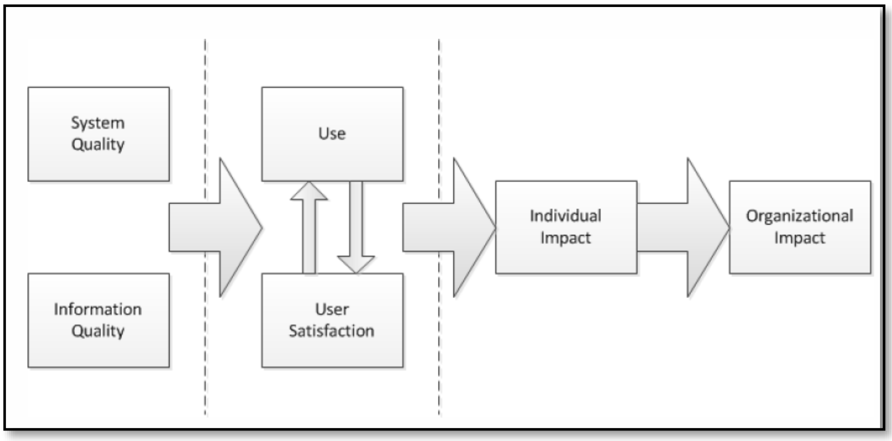


Figure 2.2: The original DeLone and McLean IS Success Model
(Source: DeLone and McClean, 1992, p. 87)

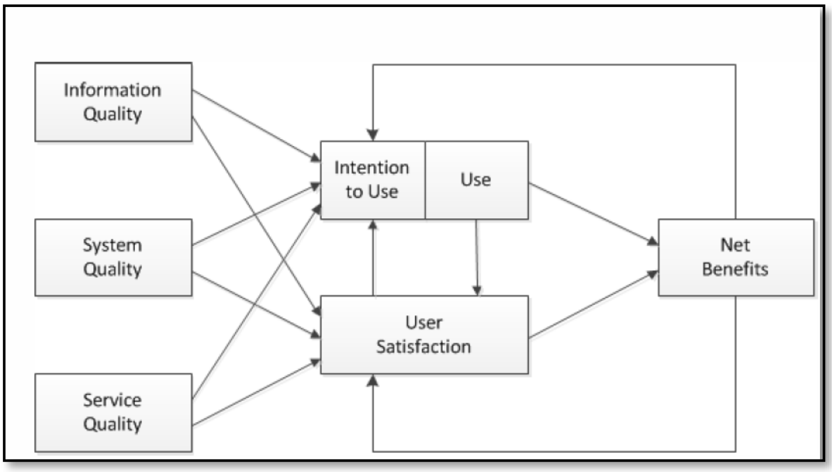


Figure 2.3: The updated DeLone and McLean IS Success Model
(Source: DeLone and McLean, 2003, p. 24)

2.3.1.2 Expectation-Confirmation Theory

Expectation-Confirmation Theory (ECT) is employed to elucidate system user satisfaction (Oliver, 1989). Earlier research in the consumer’s behavior literature makes an effort to clarify the main causes of satisfaction by concentrating on the determinants of satisfaction with the aid of the Expectation-Confirmation Theory (Oliver, 1989). Expectation-Confirmation Theory is broadly being used in the consumer behavior literature to study consumer’s satisfaction, post-purchase behavior and service marketing in general (Anderson and Sullivan, 1993; Dabholkar et al., 2000; Oliver, 1980; Oliver, 1993; Patterson et al., 1997). Furthermore, Expectation-Confirmation Theory demonstrates that consumer’s satisfaction is decided by the scale and direction of the consumer’s difference between expectations and perceived performance (Oliver, 1989). Operationally, this approach combines the influence of expectations and outcomes by calculating variation scores (post-purchase outcome minus pre-purchase expectation = disconfirmation). where the variation scores anticipate levels of user satisfaction or dissatisfaction (Lewin et al., 2010).

Information system satisfaction at the individual user level is also vital to the survival of many businesses and electronic commerce firms. Oliver (1981, p. 27) defined satisfaction in the consumption context as, "The summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience." Following this definition, the scenario behind the process of customers’ perspective purchasing/repurchasing behavior can be as follows: First, before purchasing decision customers develop initial expectation about product. Second, customers purchase product and use it, subsequently after a period of time, they form their perception about the product performance. Third, they contrast the product perceived performance with its initial expectation and analyze to which extent the expectations match to confirm the perceptions. Fourth, they form their satisfaction level toward the product based on the level of confirmation. Fifth, the satisfied customers form repurchases decisions, but dissatisfied customers cease the use of the product (Oliver, 1980).

Expectation-confirmation theory has been criticized due to several reasons. Some researchers have claimed that expectation-confirmation theory does not reflect on the potential variations in user expectation after usage experience as well as the potential effects of these variations on the cognitive processes (Lee, 2007; Mao and Palvia, 2008; Rijsdijk et al., 2007). Two counteractive views activating the debates are the pre-acceptance expectations, based mostly on external environments like media etc. versus post-acceptance expectations based on the users' direct experience (Mao and Palvia, 2008). In addition, Staples et al. (2002) stated that unrealistic high expectations may cause low IS satisfaction.

The usage of gap scores between perception and expectation as a measure of satisfaction is often debated within the literature on both theoretical and empirical grounds (Cronin Jr and Taylor, 1992; Teas, 1993) for the following reasons :

- A rational mismatch can occur when satisfaction is measured as the variance score between perception and expectation level of service. Once the customer receives the service then he will review the variance between his perception and expectation regarding the service. Potential future expectations are likely to be modified to be closer to his perception. Since the gap has become smaller, when the customer deals again with the same service, he will be satisfied whether the service quality changed or not (Roszkowski et al., 2005). In case that positive changes in service are created, it's quite possible that customers will inevitably elevate their expectations and therefore on the next experience the gap will come out again, although, positive changes have taken place (Gurney, 1999).

Alternatively, by cutting down customer expectations, a service provider could theoretically increase satisfaction without the need for creating improvements in a service (McQuitty et al., 2000; Pizam and Milman, 1993; Weber, 1997).

- When expectations are evaluated following the occurrence of the experiences, they will be affected by experience infection (Roszkowski et al., 2005). To prevent the warping of expectations by the experience, it is crucial to obtain expectations before the experience (Carman, 1990). Clow and Vorhies (1993) stated that expectation scores after the service are highly dependent on customer perceptions of services. Customers who are pleased with the service usually tend to underrate expectations, while disappointed customers will tend to amplify them. As a result, assessing the expectations after the experience would negatively affect the data reliability. This view is supported by self-perception theory, which states that an individual's perceptions and expectations are adjusted as the individual receives new information or has new experiences (Swank, 2006).
- A customer scarcely rates his actual perceptions greater than his expectations (Babakus and Mangold, 1992; Dorfman, 1979). Hence, it is absolutely very difficult to get completely satisfied customers in line with the gap standard. Still, individuals often claim to be satisfied even when their expectations are not met with the perception (Peck et al., 2001; Yrlilesel and Rimmington, 1998).
- There are statistical issues due to using a gap score mainly because variance between scores is extremely unstable (Brown et al., 1993).

The literature shows that some scholars support the gap scores, for example, Dean (1999) who assessed service quality health care environments by using gap scores. On the other hand, other scholars found that perceived score or performance-only method is a better predictor of satisfaction compared with gap score, for example, Roszkowski et al. (2005) who investigated library service quality. He pointed out that performance-only instrument was valuable in the case when user satisfaction was the main objective of the assessment.

Service quality construct had been designed by Parasuraman et al. (1988) and conceptualized as SERVQUAL scale. SERVQUALITY scale uses a gap variation between expectation and perception of customers. This scale is analogous to expectation-confirmation theory which was previously used to evaluate customer satisfaction (Cronin Jr and Taylor, 1992, 1994; Parasuraman et al., 1994). Cronin Jr and Taylor (1992) are the pioneers to propose theoretical reason for removing the expectations part of SERVQUAL and only they use that performance scales involved in the scale, and they called the scale as SERVPERF. Contrary to the gap scale concept, SERVPERF is referring only to perceive performance-only. Along with their theoretical assertion, Cronin Jr and Taylor (1992) investigate empirical SERVPERF perceive performance-only scale and they found that it surpasses the SERVQUAL disconfirmation-based scale. From then on SERVPER scale was applied by many different scholars (Brady et al., 2002; Hartline and Ferrell, 1996; Parasuraman et al., 1994; Zeithaml et al., 1996). Depending on these theoretical considerations, several scholars stated that a perceptions-only method was more suitable in assessing perceptions of service quality (Brandon-Jones, 2006; Cronin Jr and Taylor, 1992; Dyke et al., 1997; Smith, 1995). For instance, Cronin Jr and Taylor (1992) and Cronin Jr and Taylor (1994) assess service quality by using perception-only approach, in their study they didn't measure the expectation construct. Moreover, Brown et al. (2008) investigated the relationship between expectations, experiences, and satisfaction by comparing the three alternative expectation-confirmation models; such as, disconfirmation, ideal point, and experiences-only ‘perceptions-only’. The results revealed that no support was found for the disconfirmation or ideal point models. On the contrary, the results supported experience-only model.

2.4 TRUST

Trust has been often known as a major factor affecting things like capital investment, the sales of high-value investment goods, relationship marketing, cross-cultural communication, learning and various types of cooperation including hi-tech development projects, in addition to transaction governance and costs (Blomqvist, 1997). It is one of the basic variables in any human interaction (Gambetta, 1988)

The concept of trust appears in several disciplines; social psychology, philosophy, economics, contract law, market research and Information system. Trust from social psychology perspective is defined as a personal trait (Deutsch, 1958; Rotter, 1967). Rotter (1967, p. 651) define trust as "An expectancy held by an individual or a group that the word, promise, verbal or written statement of another individual or group can be relied upon." Deutsch (1958, p. 266) explain trust as "An individual may be said to have trust in the occurrence of an event if he expects its occurrence and his expectation leads to behavior which he perceives to have greater negative motivational consequences if the expectation is not confirmed, than positive motivational consequences if it is confirmed." Moorman et al. (1993) come up with an essential point when they note that both belief and behavioral intention should be present for trust to exist. Gibb and Robertson (1978) a psychologist, has introduced trust level theory. Based on this theory, trust level is seen as a vital variable determining the interaction of the processes and the resulting effectiveness of the systems. Gibb finds that trust is instinctive as a feeling, is close to love.

Philosophers see trust in many different forms and versions: it can be unconscious, unwanted or forced, or it may be trust of which the trusted is unaware (Baier, 1986). It could be a question of encounters between strangers, or of long-term trusting relationships. Trust may be absolute and unreciprocated, like trust in God or Marxism (Blomqvist, 1997). From economics perspective trust is seen as "The mutual confidence that no party to an exchange will exploit the other's vulnerability" (Sabel, 1993, p. 1133).

In marketing discipline, trust has become an issue when the emerging of relationship-marketing paradigm (Grönroos and Handelshögskolan, 1995; Salmond, 1994), where the establishment and management of trusting relationships have been pointed out (Blomqvist, 1997). Different streams throughout the relationship-marketing approach acknowledge that trust contributes to the kind of positive and cooperative behavior that is essential for long-term relationships (Morgan and Hunt, 1994b). The importance of trust for sales activities has also been demonstrated (Schurr and Ozanne, 1985). The success of personal sales is assumed to rely upon trust, e.g., on the customer's willingness to trust the salesman and the salesman's ability to show trustworthiness (Blomqvist, 1997). Trusting behavior is seen as a long-term attitude among individuals or companies (Blomqvist, 1997).

In information system discipline, trust refers to the degree to which system user has positive belief in the system characteristics, information and the honesty of the suppliers (Kini and Choobineh, 1998; Sambasivan et al., 2010). Information systems research borrows heavily from previous disciplines e.g., social psychology. de Vries (2004, p. 5) points out, “System trust can be seen as a special case of interpersonal trust.” System trust refers to the expectation about the behavior of the object (e.g., system). In contrast to conventional offline trust, online trust is created via user's interactions with online information systems (Bart et al., 2005). Users may trust the system due to several reasons : first, *moral obligation of its vendor*; the users trust the functionality of the system simply by trusting the vendor, representative or designer of the system (de Vries, 2004). Second, *interaction*; inadequate interactions with a system negatively affects the trust (de Vries, 2004). Furthermore, opting to participate in interaction with a new system or application needs substantial levels of primary trust to minimize uncertainty (de Vries, 2004). Third, *experience*; positive experience positively affect the trust level, while, negative experience negatively influence the trust (de Vries, 2004).

The deficiency of trust is among the significant factors why consumers avoid trading with electronic commerce (Ayo et al., 2011; Gefen and Straub, 2003; Jiang et al., 2008). Therefore, trust is considered as a necessity for all business interactions and is especially essential in a web-based environment whenever all users need to use online web pages (Gefen and Straub, 2003). The existence of deficiency of trust in IS has been presumed as a main reason for resistance of users to use the information systems (Kusuma and Pramunita, 2011). In e-commerce online environment, Belkhamza and Wafa (2009) stated that perceived system risk had a negative influence on behavior certainty and trust. Kusuma and Pramunita (2011) argue that in e-procurement systems users tend to refuse using the system because of its risk and untrustworthiness. However, perception of risk emerges because both parties (buyers and suppliers) interact remotely, not personally. One more reason for perceiving risk is the inadequacy of information between parties and the uncertainty of products quality (Belkhamza and Wafa, 2009). In an online environment, insufficient information causes risk in performing business in addition to the ambiguity of products quality and services provided online (Belkhamza and Wafa, 2009). The remedy is to reduce risk and trust barriers which happen due to the uncertainties in protecting private business information and in coping with anonymous suppliers (Subba Rao et al., 2007). In mandatory use systems the role of trust plays an important role; however, in the absence of system trust users may find alternative ways to conduct their work or their job tasks (Karjalainen et al., 2009). Strengthening individual trust is usually viewed as a vital factor for the effective implementation of e-government online websites (Warkentin et al., 2002). Trust is an important antecedent of involvement in on-line connections and exchanges since it helps to relieve perception of uncertainty and risk (Teo et al., 2008).

Belief is considered antecedent to attitude (Lu et al., 2012a; Underwood, 2002). Trust is a result of a system user's acceptance; consequently, it impacts system user satisfaction (Kassim et al., 2012; Lu et al., 2012a; Wu and Chen, 2005). In addition, it is a critical key that plays a significant role in predicting users' behavior in IS context (Gefen et al., 2003; Mahmood et al., 2004). Jarvenpaa et al. (2000) argue that trust impacts the attitude like satisfaction and risk perception. Geyskens et al. (1998) state that satisfaction is a critical trust outcome. Lu et al. (2012a) report the positive relationship between trust and user satisfaction in C2C platform. Balasubramanian et al. (2003) examine customer satisfaction of online investors of web-based broker site, and found a significant and direct relationship between trust and user satisfaction. In addition, the results show that environmental security and operational competence have a significant impact on the level of trust.

Many research have investigated the functionality of trust in e-commerce discipline (Belanger et al., 2002; Gefen, 2002; Van Slyke et al., 2004; Yoon, 2002). However, trust has been integrated to adopting models, like technology acceptance model (TAM) and the theory of planned behavior (TPB) (Gefen, 2002; McKnight and Chervany, 2002; Pavlou et al., 2003; Pavlou, 2003; Warkentin et al., 2002). Furthermore, in TAM trust is found to be influenced by perceived ease of use; in addition, it is considered as an antecedent of perceived usefulness (Gefen et al., 2003; Pavlou et al., 2003), as well as trust has a significant effect on attitude (Kassim et al., 2012; Lean et al., 2009; Liao et al., 2006; Wu and Chen, 2005). On the other hand, from TPB perspective, trust is found to be a common antecedent of attitude, perceived behavioral control, and subjective norm (McKnight and Chervany, 2002; Pavlou, 2003).

In the previous decade, some researchers showed their interest in investigating empirically the role of trust in e-government systems (Bélanger and Carter, 2008; Teo et al., 2008; Warkentin et al., 2002). For instance, Teo et al. (2008) investigated the role of trust in e-government success based on IS success model. The researcher hypothesizes that trust in government websites is influenced by trust in government and trust in technology. The data was collected from 214 users of e-government websites in Singapore. Study results revealed that trust in e-government websites are influenced by trust in the government but not by trust in the technologies used.

Klafft (2009) conduct a research in e-procurement system context to investigate the factors that are generating e-procurement system platform advancement, and the potential obstacles for e-procurement system success in Germany. By employing a focused group interviews the results show that mistrust is the main obstacle between buyers and suppliers and even among competing suppliers. The study found that the effect of trust is stronger than ease of use and usefulness in acceptance models. The results of this study recommends trust building between online parties ‘suppliers and buyers’ in order to take the full advantage of e-procurement system web sites and platforms which can take place by improving system reputation and reliability, quality of exchanged information, and providing insurance services.

Nicolaou and McKnight (2006) examine the impact of information quality on the success of inter-organizational data exchange. They proposed that perceived risk and perceived trust as mediators between information quality and intention to use data exchange. The data was collected by employing a questionnaire and an experimental approach. The questionnaires were collected from 26 purchasing managers and 69 MBA students. The results of this study revealed that perceived information quality has a significant influence on trust and risk, which also has a significant influence on intention to use data exchange between organizations. Similarly, Nicolaou and McKnight (2006) found that information quality perception was an antecedent to trust. Furthermore, in online environment, trust can be built by improving transparency through providing consistent products and pricing information (Schwind et al., 2011).

Blomqvist (1997, p. 283) emphasizes that, "Trust is based on experiences." In online environment, trust is developed when buyer has a positive experience with supplier by means of things such as order fulfilment, service, product quality (Urban et al., 2009). Positive experience positively affects the trust level while negative experience negatively influences the trust (de Vries, 2004); however, suppliers order fulfilment is one of the experiences that is perceived by the e-procurement system user. Distrust also indicates violations of buyer expectations (Zhang et al., 2011). Schwind et al. (2011) identify the lack of e-fulfilment and the lack of trust as the major issues in online environment. Gupta et al. (2009) point out that buyers form trust perceptions simply by assessments of the seller’s related task performance. When a buyer's perception of supplier order fulfilment is high, the buyer believes that the supplier has the strength and appropriate capabilities related to order fulfilment and is assured that he/she will receive the product on time. This, consequently, improves his/her satisfaction and trust (Chiu et al., 2010; Zhang et al., 2011). Pillai et al. (2001) believe that when outcome distributions are viewed honestly, greater levels of trust are likely to occur. To put it differently, a buyer’s trust in the supplier will be developed once the product is delivered accurately on time and has high-quality. Empirically, Bart et al. (2005) find that order fulfilment is the dominant factor that affects trust in online travel services context. Furthermore, superior performance of order fulfilment is expected. If this expectation is not fulfilled, trust might decline. As pointed out by Morgan and Hunt (1994a), the presence of trust and relationship commitment in business relationships is crucial; however, it improves the collaboration and reduce uncertainty between the parties. Doney and Cannon (1997) express that trust is crucial in inter-organizational exchanges in the way that it reflects interpersonal behavior.

2.4.1 Trust mediation effect

The mediation effect of trust was proved by several scholars. Study by Sultan et al. (2002) reveal that trust mediated the relationship between two independent variables web site characteristics, consumer characteristics, and the dependent variable consumer behavioral intent. Another study in the context of inter-organizational electronic exchanges showed that the relationship between perceived information quality and intention to use is mediated by trusting beliefs (Nicolaou and McKnight, 2006). Furthermore, Choon Ling et al. (2011) hypothesize that the relationship between perceived technology and online purchase intention is mediated by trust, the results of study supported the relationship. In addition, trust shows a mediating effect between antecedents just like environment uncertainty and consequences like satisfaction in a relationship marketing context (Geyskens et al., 1999). Another study by Singh and Sirdeshmukh (2000) show a mediation effect of trust between agency mechanisms and satisfaction. Recently, Kassim et al. (2012) investigate the mediation effect of trust between system acceptance variables and end-user satisfaction. They targeted student information system. The data was collected from 331 students of higher learning organizations. The results of this investigation showed that system quality, information quality, and ease of use have a direct positive relationship on trust, while, trust had a direct positive relationship with system satisfaction. Most importantly, trust had a mediating effect between system acceptance variables and satisfaction.

2.5 PERCEIVED E-PROCUREMENT QUALITY

System quality was defined by DeLone and McLean (1992, p. 64) as, "Measures of the information processing system itself," while Wu and Wang (2006) view it as operational features. Moreover, Delone (2003) highlights that in the IS success model, systems quality measures technical success, information quality measures semantic success, and use, user satisfaction, individual impacts, and organizational impacts measure affective success. Perceived quality in general refers to client opinion about an organization's efficiency (Zeithaml and Institute, 1987). However, from an organizational perspective, providing superior system quality to the user is a main concern of organizations (Parasuraman et al., 1988). In spite of this, managing and enhancing system quality is really a complicated task and expensive in today’s system advancement. DeLone and McLean (1992) mention that user perceptions of system quality represent ‘actual’ system quality (DeLone and McLean, 1992). Information system literature pointed out the ability of end user to evaluate system quality (Edberg and Bowman, 1996; Kreie et al., 2000).

Quality is an important construct with numerous viewpoints, and the complication of evaluating quality comes from its several essential dimensions (Guimaraes et al., 2009). It is a multi-dimensional construct that is complicated to evaluate (Azizian, 2011; Guimaraes et al., 2009). DeLone and McLean (1992) and Parasuraman et al. (1988) agree that system quality measures were subjective in their nature as they reflect user perception.

In IS context, several studies investigated quality perceptions by using three different constructs; system quality 'technical quality', information quality 'information provided by the system', and service quality 'support and assistance provided to users' (Delone, 2003; DeLone and McLean, 1992). Many studies deployed the IS success model; the results varied from one study to another as presented in Table 2.4. For more illustration, Table 2.5 shows the direct relationships results between system qualities (System, information and service quality) and user satisfaction.

For example, Negash et al. (2003) conduct empirical study on web-based customer support systems; data were collected from 726 students in USA, the results showed a significant relationship between system quality, information quality, and service quality with user satisfaction. Wang and Chiu (2011) perform a research on e-learning system, data were collected from 288 students in Taiwan. The results reported a significant relationship between information quality, service quality, and communication quality with user satisfaction, but system quality do not have a significant relationship with user satisfaction. Another study by Ainin et al. (2012) aimed to examine the National Higher Education Fund Corporation (PTPTN) portal performance 'user satisfaction'. The study evaluated system quality, service quality, information quality, and perceived usefulness by integrating the IS success model and the technology acceptance model. The data was collected from 258 university students in Malaysia, the result found that perceived usefulness is the only significant factor that affects the level of students satisfaction.

Table 2.4: The Findings of The Direct Relationship Between different factors and User Satisfaction

Reference	IS Application	Population	Direct antecedents to user satisfaction	Result
Negash et al. (2003)	Web-based customer support systems	726 university students in USA	Information quality System quality Service quality	Sig.+ Sig.+ Sig.+
Wu and Wang (2006)	Knowledge Management Systems	204 KM users in Taiwan	System quality Information quality perceived benefits	Sig.+ Sig.+ Sig.+
Lee et al. (2007a)	Application Service Provider (ASP)	203 ASP system users in Korea	System Quality Information Quality Service Quality	N/Sig. Sig.+ Sig.+
Wang and Liao (2008)	eGovernment Systems	119 eGovernment system users in Taiwan	System Quality Information Quality Service Quality Use	Sig.+ Sig.+ Sig.+ Sig.+
Chen (2010)	Online Tax-filing System	278 taxpayers in Taiwan	Information quality System quality Service quality	Sig.+ Sig.+ Sig.+
Floropoulos et al. (2010)	Taxation Information System	340 employees using TIS in Greek	Information quality System quality Service quality Perceived usefulness	Sig.+ N/Sig. Sig.+ Sig.+
Petter and Fruhling (2011)	Emergency Response Medical Information System	64 system users in USA	System quality Information quality Service quality	Sig.+ Sig.+ Sig.+
Wang and Chiu (2011)	eLearning 2.0 System	288 University students in Taiwan	System quality Information quality Service quality Communication quality	N/Sig. Sig.+ Sig.+ Sig.+
Aggelidis and Chatzoglou (2012)	Hospital Information Systems	283 Hospital Information Systems users in Greek	Support In Sourcing Support out Sourcing System quality Information quality	N/Sig. N/Sig. Sig.+ Sig.+
Ainin et al. (2012)	E-government Portal	258 university students in Malaysia	System quality Information quality Service quality Perceived usefulness	N/Sig. N/Sig. N/Sig. Sig.+
Lee and Yu (2012)	Project Management Information System	253 managers and contractors users in construction industry in Korea	System quality Information quality Service quality	N/Sig. Sig.+ Sig.+
Zheng et al. (2012)	Virtual Communities	281 users of VCs for travelers in USA	Information quality System quality Individual benefits	Sig.+ Sig.+ Sig.+
Balaban et al. (2013)	Electronic Portfolios	186 students in Europe and USA	System quality Service quality Information quality Net benefits Use	N/Sig. Sig.+ N/Sig. Sig.+ Sig.+

Table 2.4: The Findings of The Direct Relationship Between different factors and User Satisfaction, continued

Reference	IS Application	Population	Direct antecedents to user satisfaction	Result
Zhou (2013)	Mobile payment	195 mobile users in China	System quality Service quality Information quality Flow	Sig.+ N/Sig. N/Sig. Sig.+
McGill et al. (2003)	User-Developed Applications	79 end user developers in USA	System quality Information quality	Sig.+ Sig.+
Bharati and Chaudhury (2004)	web-based decision support systems	210 MBA students at two different universities in USA	System quality Information quality Information presentation	Sig.+ Sig.+ Sig.+
Klobas and McGill (2010)	learning management system	244 university students in Australia	Use System quality Service quality Information quality	N/Sig. Sig.+ Sig.+ Sig.+
Dwivedi et al. (2013)	Libraries are deploying Radio Frequency Identification (RFID) technology	181 FRID users in UK	Use System quality Service quality Information quality	Sig.+ Sig.+ N/Sig. Sig.+

N/S : Not Specified
Sig.+ : Significant Positive Relationship
Sig.- : Significant Negative Relationship
N/Sig. : Not significant relationship

Table 2.5: The Findings of The Direct Relationship Between System qualities and User Satisfaction

Reference	Information quality	System quality	Service quality
Negash et al. (2003)	√	√	√
Wu and Wang (2006)	√	√	N/S
Lee et al. (2007a)	√	X	√
Wang and Liao (2008)	√	√	√
Chen (2010)	√	√	√
Floropoulos et al. (2010)	√	X	√
Petter and Fruhling (2011)	√	√	√
Wang and Chiu (2011)	√	X	√
Ya-Yueh (2011)	X	X	X
Aggelidis and Chatzoglou (2012)	√	N/S	√
Ainin et al. (2012)	X	X	X
Lee and Yu (2012)	√	X	√
Zheng et al. (2012)	√	√	N/S
Balaban et al. (2013)	X	X	√
Zhou (2013)	X	√	X
McGill et al. (2003)	√	√	N/S
Bharati and Chaudhury (2004)	√	√	√
Klobas and McGill (2010)	√	√	√
Dwivedi et al. (2013)	√	√	X

N/S : Not Specified
√ : Significant Positive Relationship
X : Not significant relationship

In e-government context, Prybutoka et al. (2008) conduct empirical research to examine the influence of leadership and IT quality on net benefits. They found a strong relationship between IT quality and net benefits. This study operationalized IT quality as a second order construct that consisted of three dimensions: system quality, information quality and service quality. Net benefits were operationalized as first order construct measured by three items representing individual satisfaction, individual performance, and organizational performance. 178 questionnaires were collected from e-government users. The findings conclude that leadership and IT quality had a positive direct relationship with net benefits.

Another study in e-government context, Wang and Liao (2008) investigate G2C voluntary systems success via the citizens' viewpoint, based on Delone (2003) updated IS success model. Structural equation modeling methods were employed on the data obtained by the survey from 119 users of G2C e-government systems in Taiwan. The authors investigated the relationship between six dimensions: information quality, system quality, service quality, use, user satisfaction, and perceived net benefit. These outcomes claimed that all qualities perceptions (information, system, service) have significant positive effect on user satisfaction, while just information and service qualities have positive effect on system use. In addition, information quality showed a superior effect on system use, user satisfaction, and perceived net benefit, compared to system quality and service quality. This study is comprehensive by presenting qualities perceptions (information, system, service) in the voluntary use system, and their relationship with both usage and user satisfaction. However, this study overlooked other external motivations that can affect satisfaction and use like risk or trust.

Recently, in 2013, Zhou (2013) perform an investigation in mobile payment services context, based on IS success model and flow theory, they constructed a model to test the direct effect of perceptions qualities (system, information, service) on user satisfaction, flow, and trust, in addition to their indirect effect on continuance intention. By spotlighting the findings related to user satisfaction part, it revealed that only system quality has a significant positive direct effect on satisfaction while there was no significant effect from information and service quality on user satisfaction. In other study, Vance et al. (2008) note that system quality influences trust.

Guimaraes et al. (2009) emphasize that system quality elements rely on the characteristics necessary to the system as well as on the stakeholder's view. Therefore, the following Table 2.6 shows some empirical studies measurements of qualities perception. As it can be highlighted from Table 2.6 that quality measurement was decided according to the IS application nature and environment. For example, under Online Tax-filing System, Chen (2010) measured system quality by three variables (Access, Interactivity, Ease of use), information quality by two variables (Informativeness, Accuracy) and service quality by three variables (Responsiveness, Reliability, Empathy).

Contrary to the previous studies which deal with qualities perceptions as separated constructs. Brandon-Jones (2006) had a vision to include all system perceptions qualities into one scale to draw the overall picture of system quality. In his thesis, Brandon-Jones (2006) based on expectation-confirmation theory he developed and empirically tested the system quality scale in e-procurement system context. Brandon-Jones called the scale 'perceived e-procurement system quality (EPQ)'. Perceived e-procurement system quality scale contains six dimensions: professionalism, processing, training, content, usability, and specification. After that he conceptualized the perceived e-procurement system quality scale, he investigated the direct impact of perceived e-procurement system quality on e-procurement system usage (compliance), in addition to its indirect impact on procurement expenditure; see Figure 2.4. Perceived e-procurement system quality scale is a valuable analytical tool, which could focus on weak points in e-procurement system performance (Brandon-Jones, 2006).

Table 2.6: The Empirical Measures of System, Information and Service Quality

Reference	***IS Application***	***System Quality Measures***	***Information Quality Measures***	***Service Quality Measures***
Negash et al. (2003)	Web-based customer support systems	Interactivity Access	Informativeness Entertainment	Tangibles Reliability Responsiveness Assurance Empathy
Lee et al. (2007a)	Application Service Provider (ASP)	Response time System reliability System availability	Accuracy Format Timeliness	Responsiveness Reliability Assurance Empathy
Cheung and Lee (2008)	Web-Based Information Systems	Access Usability Navigation	Understandability Reliability Usefulness	
Wang and Liao (2008)	eGovernment Systems	User friendly Easy to use	Precise Sufficient Up-to-date	Solving problems Safe Individual attention
Adeyinka and Mutula (2010)	eLearning	Availability Reliability Response time		
Chen (2010)	Online Tax-filing System	Access Interactivity Ease of use	Informativeness Accuracy	Responsiveness Reliability Empathy
Aggelidis and Chatzoglou (2012)	Hospital Information Systems	Ease of Use Speed Documentation Interface Training	Content Accuracy Format Timeliness	
Lee and Yu (2012)	Project Management Information System	Connectivity Usability	Format Currency Accuracy Relevance	Responsiveness Follow up service Assurance Reliability
Zheng et al. (2012)	Virtual Communities	Navigation Security Accessibility Interactivity Appearance	Reliability Richness Objectivity Format Relevancy Timeliness	
Chen et al. (2013)	Electronic Commerce Web Sites	Usability availability	Informativeness Organization Entertainment	Trust Empathy
Garcia-Smith and Effken (2013)	Clinical Information Systems	Ease of Use Accessibility Reliability	Perceived Usefulness Content Completeness Format Accuracy	

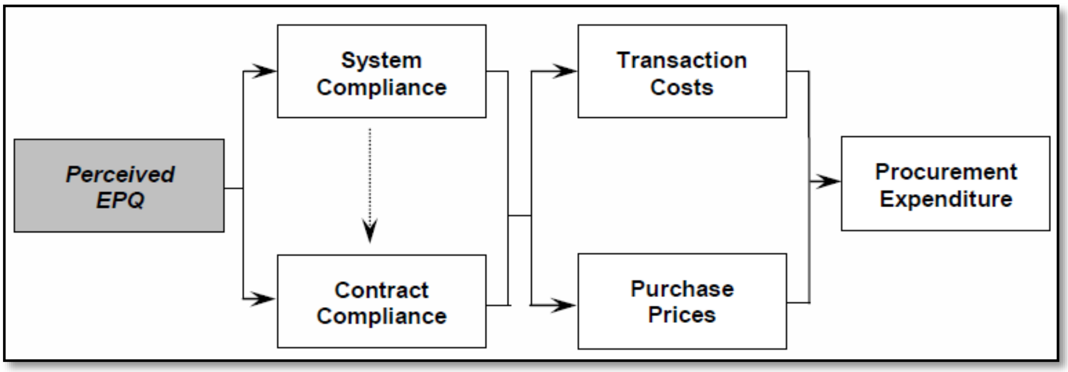


Figure 2.4: The Role of Perception of E-procurement System Quality
(Source: Brandon-Jones, 2006, p. 31)

Perceived e-procurement system quality was defined as a user perception of measuring the e-procurement system in terms of professionalism, processing, training, content, and usability (Brandon-Jones, 2006; Brandon-Jones and Carey, 2011). Perceived e-procurement system quality construct according to Brandon-Jones was built up from three 'pillars': Internal Service Quality, Information Systems Quality, and E-Service Quality, as indicated in Figure 2.5. The researcher states that these pillars are suitable to online and internal users' environment while service quality has been used in offline external customer's environment.

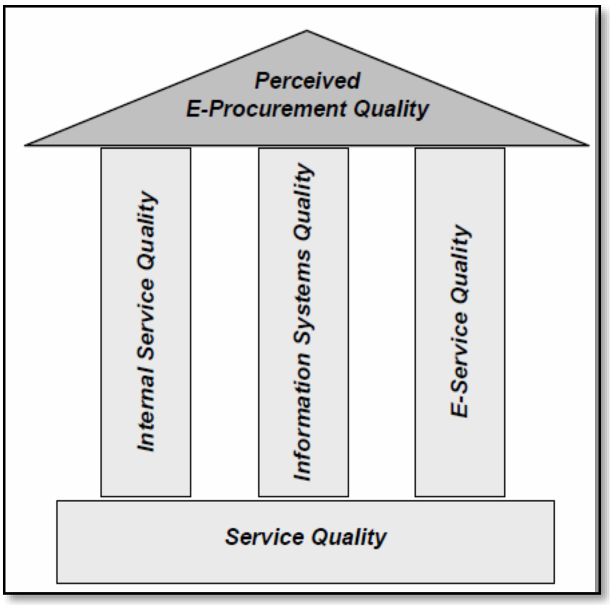


Figure 2.5: Foundation & Pillars of Perceived E-procurement Quality

(Source: Brandon-Jones, 2006, p. 31)

The first pillar is internal service quality that refers to the perception of service quality from internal customers (users) perspective. Internal service quality was defined by Brandon-Jones (2006, p. 52) as, "the quality of service delivery as perceived by internal customers." Nowadays, organizations realize the importance of offering service quality to internal customers (Bruhn, 2003). Little (2003) stated that fulfilling the needs of external customers was not enough to achieve business success. Delivering service to organization employees had a positive effect on productivity and on external customer service (Kang et al., 2002). Internal customer was defined by Nagel and Cilliers (1990) as an individual in a company who was served with a product or service from other individuals inside a company. From the definition end-system user is considered as internal customer. Organizations should realize internal customer requirements and expectations and attempt to accomplish them by delivering quality internal service (Frost and Kumar, 2000).

The second pillar of perceived e-procurement system quality according to Brandon-Jones (2006) was information system quality. However, most of the prior studies dealt with information systems quality as a first-order construct and was focused on recognizing individual items (Ives et al., 1983; Larcker and Lessig, 1980; Swanson, 1982; Zhou, 2013). Other studies measured information systems quality as a second-order construct consisting of several first-order dimensions.

Three well-known scales that deal with system quality: End-User Computing Satisfaction (EUCS) (Doll and Torkzadeh, 1988), User Information Satisfaction (UIS) by (Baroudi and Orlikowski, 1988), and Information Systems Success Model ISS by (DeLone and McLean, 1992).

End-User Computing Satisfaction (EUCS); Doll and Torkzadeh (1988) developed an instrument to measure computer users' satisfaction, by collecting data from 618 end user. He finalized the EUCS which consists of 12 items that measured 5 determinants which are content, accuracy, format, ease of use, and timeliness. Their instrument achieved a good level of validity and reliability.

User Information Satisfaction (UIS) by Baroudi and Orlikowski (1988), based on the work of Bailey and Pearson (1983), the measure is designed to assess the products and services of an organization's information systems function. They developed a scale and validated it by a sample of 358 employees from 26 New York area organizations in various industries. The purpose of developing this construct was to deliver an instrument that can help the organizations to identify the problems of their information system and to direct the efforts to solve these problems. After assessing the validity and reliability, the study identified (UIS) with three dimensions (1) Quality of information product, (2) Staff and services, and (3) Users knowledge and involvement.

The Information Systems Success Model by DeLone and McLean (1992) was criticized by Pitt et al. (1995) for being product-oriented because the model concentrated only on information and system quality. This indicated that the measurement was bias.

Regardless of the focus given to approaching user-perceived quality of procurement functions, there exists a narrow comprehension of the construct in an e-procurement system context (Brandon-Jones and Carey, 2011). Limited studies contributed to perceived e-procurement system quality scale (Brandon-Jones, 2006; Brandon-Jones, 2008; Brandon-Jones and Carey, 2011). However, this study will build on the foundation of perceived e-procurement system quality.

This research deals with perceived e-procurement system quality as a multi-faceted construct that consists of five dimensions: professionalism, processing, content, training, and usability. Perceived e-procurement system quality construct represents end users' subjective perception of e-procurement system. Perceived e-procurement system quality scale is extracted from many interrelated contexts, such as information systems and internal service foundation (Brandon-Jones, 2006; Brandon-Jones, 2008). The following subsections will highlight all perceived e-procurement system quality dimensions.

2.5.1 Professionalism

Professionalism refers to the degree to which the system user experiences the continual support from procurement division (Brandon-Jones, 2006; Brandon-Jones and Carey, 2011). Professionalism highlights support availability and responsiveness of specialized expertise to settle system issues in a flexible and effective way (Yang and Jun, 2002). Professionalism is a crucial concept; it means more than a degree of education and skills of the employee to reach the professional method in performing business functions (Raymond, 2008). Quick responses assist system users to overcome their difficulties and formulate decisions in a well-timed manner (Yang and Jun, 2002). Moreover, professionalism involves the behavior of support expertise, which can be measured by assessing the friendliness, concern shown, and the confidentiality of dealings (Silvestro and Johnson, 1992). The behavior of support expertise is essential, it affects the level of usage (Pitt et al., 1995). There are three types of technical support : technical assistance that was provided by IT unit, technical consultation that was offered by the vendors or partners, and technical instructions like training employees and providing related manuals and references (Hult, 1998; Igbaria et al., 1997).

Preparing skilled staff is crucial to establish a powerful internal service management. By having an escalating percentage of IS budgets being invested in IS services, more focus should be provided to the service dimension of IS (Pitt et al., 1995). In organizations, the main function of IS department is to provide service to internal users (Pitt et al., 1995), thus IS department has a vital service task since it helps system users in transforming data into information (Pitt et al., 1995). Furthermore, when IS department supplies the users with training support and improve their system knowledge, the relationship between IS and the users will improve positively (Pitt et al., 1995). When technical support assists users to operate the software and the hardware, user satisfaction with the system will improve (Croom and Johnston, 2003).

Technical support was highlighted in several studies and it was revealed that system success was influenced by system support (Igbaria et al., 1997; Lai, 2006; Tukamuhabwa, 2012). In their study, Chang et al. (2010) tried to investigate the impact of organizational support represented by management support and technical support on system usage extent. Results showed that technical support had a significant positive effect on system usage while management support did not have any effect on system usage extent.

End-users play a very significant role in evaluating e-business environment (Lai, 2006). Lai (2006) pointed out that internal service quality management is crucial in e-business context for several reasons : first, business employees are the internal customers who perceive and evaluate the internal service provided (Berry et al., 1994). Second, internal service affects and reflects the external service which is provided to the business customers (Lai, 2006). Third, the employees experience the internal service directly and frequently; they can provide understanding of the issues that negatively affect service quality in a business, because they interact directly with many dimensions like technology, customer and company (Colby and Parasuraman, 2003; Parasuraman, 2000; Zeithaml et al., 2002).

According to Raymond (2008), in developing and developed countries, government procurement seems to be prodigal field of corruption. In his article, Raymond (2008) provided many recipes to reduce the corruption; one of them is by building professionalism in various procurement functions by improving procurement employees' skills and knowledge. Similarly, Tukamuhabwa (2012) investigated some antecedents that affect public procurement compliance, professionalism was one of the main factors found to have influenced employee compliance. According to Croom and Brandon-Jones (2007), a high level of internal service will improve the level of usage among e-procurement system users. Internal service improvements were viewed to be essential in improving the overall arrangement of the organization to accept e-procurement system (de Boer et al., 2002). If the employees in the procurement unit are not appropriately prepared to handle procurement concerns, misbehavior attitudes may occur (Tukamuhabwa, 2012). Raymond (2008) pointed out that corruption is a result of insufficient degree of professionalism in the public procurement sector, which in turn hinders compliance. Therefore, Procurement unit should have an appropriate knowledge about procurement procedures, policies and regulations (Hui et al., 2011).

In the same vein, the previous literature explained the relationship between internal service quality and system user attitude toward the system. Pitt et al. (1995) implied that service quality was considered as a remarkable indicator of user satisfaction and revealed that service quality influenced user satisfaction regardless whether the user interacted with one or multiple information systems. This point was supported by Delone (2003) in their extended model under which they proposed three independent quality factors : system quality, information quality, and service quality. In addition, internal service quality was investigated in an electronic commerce context (Devaraj et al., 2002).

In his research, Lai (2006) examined enterprise applications' effectiveness by investigating the relationship between users perception of service quality and user satisfaction. They revised the SERVQUAL scale to fit the e-business context and collected data from 161 users of electronic business applications in Taiwan. The results showed that improving service quality positively influenced user satisfaction. As cited by Tan et al. (2010), Berry et al. (1985) contrasted between process and outcome quality in conceiving service quality. They stated that service quality measurements depend on timing, whereas process quality can be measured by customers throughout service execution, while outcome quality on the other hand, is measured by customer after performing the service.

In their study, Gorla et al. (2010) hypothesized that IT quality represented by system, service, and information have a positive impact on organizations. The results revealed that service quality had the highest impact on organizational performance followed by information quality, then system quality. This research spotlights the essential role of service quality reflected on organizational performance.

2.5.2 Processing

Processing refers to the degree to which system users experience system capability to manipulate, deal, and execute procurement transactions from placing an order until it reaches the supplier (Brandon-Jones and Carey, 2011). Wolfinbarger and Gilly (2003) stated that system processing can be evaluated by measuring the time of processing an order by using the system, the convenience of order authorization, and the time needed for an orders to reach suppliers. Brandon-Jones and Carey (2011, p. 278) mentioned that "Order-to-supplier speed is an important component of perceived quality."

As e-procurement system is a form of inter-organizational systems (Tai et al., 2010). Saeed et al. (2005) pointed out that inter-organizational systems facilitate the exchange and the process of the information; therefore, the time information substitute the old manual functions. Clemons et al. (1993) argued that inter-organizational technologies enable partners to remotely access to the other databases; for instance, the buyer can check out the availability of the suppliers' product before placing an order, as well as the supplier can check out the client's purchasing forecasts before they produce or prepare the products. Furthermore, system integration between buyers and sellers facilitate bidirectional sharing of the information, and hence strong inter-organizational integration improves process efficiency by reducing coordination costs and leveraging inventory management (Clemons et al., 1993; Frohlich and Westbrook, 2002). Mukhopadhyay and Kekre (2002) declared that inter-organizational systems allow the buyer to directly place electronic orders without long verification process, eliminating the requirement of printing or reentering the order again after verification, that leads to reduce time and errors. Obviously, inter-organizational integration considerably enhances the order processing at both parties' side, thus improving procedural effectiveness.

From a purchasing perspective, e-procurement system has four main impacts on B2B operations : content searching, order processing, controlling and monitoring functions, and coordinating with partners (Subramaniam and Shaw, 2002). As cited by Vaidyanathan and Devaraj (2008), Carbone (1997) acknowledged a number of the significant features of e-procurement system in contrast to conventional purchasing to comprise a faster and more accurate processing, enhanced order tracing, advanced information management, and elevated buyer satisfaction. In addition; e-procurement system has the capacity to realize these characteristics by providing e-catalogs information and remove the ineffectiveness of conventional purchase processing (Madu and Madu, 2003). Moreover; e-procurement systems facilitate the execution of complex orders, Brandon-Jones and Carey (2011) claimed that user perception of complex order processing quality can be experienced by system speed, accuracy, and capability. He added, when the user of e-procurement system experienced weak system capability to process complex orders, he will search for another purchasing method to fulfill his needs.

Electronic processing provides organizations with a better chance to leverage the lead-time and the accuracy of the information (Croom and Johnston, 2003; Gunasekaran and Ngai, 2008; Sriram and Stump, 2004), and it eliminates paper documents and improves the speed of order approval and processing (Wojciech and Zahir, 2010). At the same time, the use of e-catalogue reduces processing time needed to place an order (Brandon-Jones, 2009); consequently, using e-procurement systems decrease user compliant by minimizing errors and improving the match between user need and products received (Subramaniam and Shaw, 2002).

System processing influences user satisfaction when, "the perception of users that the system effectively meets their business demands" (Subramaniam and Shaw, 2002, p. 26). They added that user satisfaction can be enhanced by several factors : First, a user need fulfilment, thus delay and errors in processing orders will negatively affect user satisfaction. Second, reduce users’ efforts by improving the search and access to requested information. Third, flexible interacting with the system by dealing with ease of use interfaces (Subramaniam and Shaw, 2002).

Both system quality and system design affect the perception of information quality (Nicolaou and McKnight, 2006). Information quality includes system development and information processing; information quality reflects the accuracy, reliability and timeliness of that information (Pitt et al., 1995). As cited by Nicolaou and McKnight (2006), Boritz (2004) argued that system integrity had a great impact on information processing integrity. Nicolaou and McKnight (2006, p. 336) stated, "A system demonstrates processing integrity if its processes are complete, accurate, timely, and authorized." Delivery, flexibility, and efficiency are generally based on time; therefore, they count more greatly on the speedy and also flow of information and products between supply chain parties, demanding a higher level of suitable structures for productive and successful information processing (Schmenner and Swink, 1998).

Zhou and Benton Jr (2007) stated that in order to improve organizational performance, organizations should leverage their dynamism by increasing information processing capacity. As cited by Zhou and Benton Jr (2007), Galbraith (1973) pointed out that information systems are the main tools that enhance information processing capacity. Zhou and Benton Jr (2007, p. 1353) pointed out, "Effective supply chain practices are the 'structures' that can increase information processing capacity." Perceiving data assurance is essential in determining the quality of information processing. Nicolaou (2011, p. 114) defined data assurance as "beliefs of system users about the level of transparency they perceive in transaction and processing controls during their exchange of data in a web-based environment." He added, the more the reliability of the data exchanged in B2B context the less the uncertainty about the transmission and information processing of that data.

On the same vein, organizations operating in information intensive environments will certainly have greater information processing demands supposed to substantially influence their own technology usage (Ranganathan et al., 2011). Online technologies facilitate better information processing and comparatively lessen costs, and for that reason information intensive environments will probably promote substantial levels of web-enabled supply chain management functions (Ranganathan et al., 2011). Ranganathan et al. (2011) found in his study that the extent to which the organization uses online technologies such as e-procurement system to process their supply chain activities like selecting suppliers and order processing etc. the greater the perception of organizational performance as cost reduction, order timeliness and inventory management etc.

2.5.3 Training

Training provides system users with the logic and the needed knowledge to use the e-procurement system (Mandal and Gunasekaran, 2002). Training refers to the degree of which the system users experience adequate, specific timely training, in addition to the degree the training influences users work (Mandal and Gunasekaran, 2002). Brandon-Jones (2006) defined training as the provision of support in e-procurement unit by professionals who are capable to aid the system users by providing periodical and continuous trainings and seminars. Most importantly, the information and practice provided to the users by the system provider clarify how to use the system (Brandon-Jones, 2006; Brandon-Jones and Carey, 2011). Tracey et al. (2007, p. 314) summarized work environment in some words, “hire for attitude, train for skill.” Moreover he stated that “employee performance of the job is dynamic and changes over time. Some people can hit the ground running when they assume a new job, but most people require some amount of training to gain a complete understanding of their tasks and also demonstrate proficiency” Tracey et al. (2007, p. 314).

Training role in advance IS implementations are well recognized by the literature (Duplaga and Astani, 2003; Robey et al., 2002). In order to take a full advantage of IS and enhance the performance, organizations tend to invest in training its end users (Basheka and Mugabira, 2008; Cronan and Douglas, 1990). Therefore, several organizations concerned in providing training to their users to improve their knowledge levels and sharpen their skills, which, result in leveraging system quality (McGill and Klobas, 2005).

Highly demanding information systems are depending intensely on end users adoption (Elie-Dit-Cosaque and Straub, 2010). Therefore, training the employees to a level that can leverage their ability to handle the system is shown to be vital for realizing the system benefits (Gardiner et al.; Norton et al., 2012) while the absence of acceptable training has been labeled as a crucial cause of inadequacy in system usage (Henriksen and Andersen, 2008). Training plays a major role in implementing ERP systems (Bradley and Lee, 2007). Several studies pointed out that the main reason of implementation failures of ERP system was due to limited or insufficient training (Duplaga and Astani, 2003; Robey et al., 2002; Somers and Nelson, 2004). In order to realize the benefits of highly demanding information systems, the relationship between the organizations and system providers should carry on to be developed post-implementation (Norton et al., 2012). In complex systems, transferring the knowledge and experience of system vendors is very essential for client organizations (Brown and Vessey, 2011). Study by Wang et al. (2007) reported a positive relationship between organizational absorptive capacity and vendor skills in transferring knowledge and experience.

Norton et al. (2012) conducted a case study research by using in depth interviews to examine training delivery in organizations implementing highly demanding information systems. The results showed that end user training and post implementation requirements played very important roles in the success of highly demanding information systems. The organization can harvest a full advantage from training by mapping the training requirements during the implementation lifecycle. In ERP environment, Amoako-Gyampah and Salam (2004) investigated the impact of communication and training on system ease of use and usefulness; they introduced the shared belief in the benefit of the system construct as a mediator. The results showed that communication and training influenced the shared belief construct that at the same time have a significant impact on perceived ease of use and usefulness of the ERP system.

From the lens of resource based view (RBV), building up skilled staff by providing a comprehensive training program will enhance the human resource capabilities which in turn leverage organizational performance (Khandekar and Sharma, 2005; Tharenou et al., 2007) as well as financial performance (Jonesa et al., 2011). Job performance is considered as a reflection of an effective training program (Devaraj and Babu, 2004). Thus, the adequacy of training influences the capability of system users to use the system (Brandon-Jones and Carey, 2011). Benedict et al. (1997) noted that specific and quality training programs that satisfy system end-users are essential when the business make huge investments in information technology. Compeau et al. (1995) pointed out that the efficient training and learning process should include all training features starting from preparing and delivering training to system end-users and end by fulfilling post-training requirements. Norton et al. (2012) said training should be organized to build up progressive system capabilities. To leverage training receptivity, it is important to provide training materials for particular skill-based requirements (Chow et al., 2008). Garavan et al. (2012) emphasized that the customization of training materials leads to improved employee's skills. Delivering a powerful training program is based on evaluating and analyzing task requirements (Iqbal and Khan, 2011). Moreover, In order to assess the effectiveness of training, the organization should evaluate the quality of the material associated with it (Brandon-Jones and Carey, 2011). This indicated the significance of evaluating training programs in organizations.

Unfortunately, few organizations perform reliable assessments for training programs (Griffin, 2010).

McGill (2002) indicated that system end-user with low experience may incorrectly evaluate the quality of such system. End-user perception of the system could possibly be inadequate due to the deficiency of user knowledge. For example, system users with acceptable level of knowledge can perceive system quality in an accurate manner, as opposed to the users with low knowledge who may not identify system quality issues (McGill and Klobas, 2005). Yaverbaum and Nosek (1992) stated that the role of training played a significant role in evaluating system quality. Rodgers and Negash (2007) demonstrated that developing knowledgeable staff improved knowledge transferring within the organization. It has been noticed that organizations providing training programmers have greater average retention of employees (Garavan et al., 2012; Kucherov and Zavyalova, 2012).

In e-procurement system context, training is reported to be one of the critically successful factors of e-procurement systems (Leipold et al., 2004; Panayiotou et al., 2004; Vaidya et al., 2006). Training users to use e-procurement system will improve their ability to handle their job task and reduce the maverick buying behavior (Angeles and Nath, 2007; Karjalainen and van Raaij, 2011); therefore, to ensure a high level of e-procurement system compliance organizations should provide adequate training for their employees (Karjalainen and van Raaij, 2011). Croom and Brandon-Jones (2007) pointed out that support provision in e-procurement system improved user’s compliance to the system; this idea was supported by Angeles and Nath (2007) who stated that organizations could overcome the resistance of end users to use the system by providing adequate intensive training programs and suitable education sessions. Training and education are important to ensure the success of e-procurement system (Gunasekaran and Ngai, 2008). Raymond (1990) pointed out that training is one of the main factors that affect system user acceptance. Raymond and Bergeron (1992) mentioned that user training influenced user decision-making satisfaction. Another study by Igbaria et al. (1995) reported that training affects perceived usefulness positively.

Lassila and Brancheau (1999) suggested that when organizations decide to transform their business process from a traditional way to an electronic way, it should provide comprehensive training to its staff. A comprehensive training that deals with system features and new work procedures is essential; therefore, assigning budget for training user must not be neglected. Brown (2001) mentioned that the IT budget should not only consider purchasing hardware and software, it should include training costs also. Training leads to lowering operational and cultural concerns stumbled upon throughout an implementation process (Grossman and Walsh, 2004).

2.5.4 Usability

Usability refers to the degree to which system user experience, and perceived ease of use, interact flexibly and navigate around an e-procurement system (Brandon-Jones and Carey, 2011). Levi and Conrad (1997) defined usability as to which level the system in use can help the user to complete his task. ISO/9241-11 (1998) defined usability as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use", as cited by Bevan (2009, p. 108). ISO/IEC9126-1 (2001) renamed usability as ‘quality of use’ because it was considered as user's viewpoint of product quality after using it (Bevan, 1999). Marcus (2002) stated that usability improves user satisfaction and productivity, and without doubt leads to higher ROI. If a mandatory system is troublesome to use, then users will probably be disappointed and experience a degree of required efforts to be relatively high, as opposed to the perceived effort needed to use mandatory system, which should be minimal (Berry et al., 2002). Even when a system executes its main technical function perfectly, if a user could not utilize the system to work, that system is considered unsuccessful (Kortum and Bangor, 2012).

Preliminary work on determinants of satisfaction was undertaken by Szymanski and Hise (2000) who found the capability of online website design as a determinant of satisfactory purchase experiences. This conclusion has been recognized by numerous scholars later on. For instance, Kim and Eom (2002) determined that usability is of substantial significance in forming user satisfaction. Lately, Maditinos and Theodoridis (2010) stated that two key factors affect the level of satisfaction : online interface quality and online system content.

In his book titled ‘Usability Engineering’, Nielsen and Hackos (1993) defined usability as maintaining five characteristics : learnability, efficiency, memorability, errors, and satisfaction. Learnability is defined as a system being easy to learn and allowing the user to rapidly complete work. Efficiency means reaching an advanced stage of productivity by using the system. Memorability is a feature of the system that facilitates the possibility to remember how to deal with the system easily without extended efforts to learn it again. Error is a thing the user has to discover frequently and also something the user should overcome promptly. Satisfaction is the impression a user sensed when utilizing the system. However, Flavián et al. (2006) identified another five characteristics of online system usability : ease of use and comprehension of the system and its interface and functionality, convenience of interacting with the system in the initial use, responsiveness of the system with user interaction, ease of system navigation in terms of time and action required to achieve the planned results, and the capability of the system to be controlled by the user in what, where and when he wants.

In their study, Belanche et al. (2012) investigated the effect of website usability on user satisfaction and intention to use, in addition to the effect of satisfaction on intention to use the website. Data was collected through an online survey targeted to the users of a Spanish online retailer, with 214 valid questionnaires. The results of this study revealed that website usability directly influenced satisfaction, while usability had an indirect effect on intention to use. However, Belanche et al. overlooked the fact that several other variables contribute to user satisfaction and intention to use like security and content etc.; in addition, in his paper the respondents were the users of one well known website in Spain which limited the generalizability of the effects between variables.

Many scholars have stated that there is a relationship between system usability and trust. System usability improves user's confidence using the system. As a result it may enhance user's trust (Bearden et al., 2001; Flavián et al., 2006; Kantowitz et al., 1997). Moreover, system usability improves the understanding of the system tasks and the content. Consequently, this decreases users' mistakes and fear and improves trust (Flavián et al., 2006; Muir and Moray, 1996). For instance, study of website usability was carried out by Flavián et al. (2006), who examined the direct impact of perceived usability on users' trust, satisfaction, and loyalty. By collecting 351 questionnaires from websites users, the data was analyzed by using structural modeling. The results of this study indicated that the increase in website usability had a direct and positive influence on user's trust and satisfaction as well as it has indirect effect on user's loyalty. Flavián's paper would have been more useful if he had considered other independent factors that may affect user's trust, satisfaction, and loyalty of online websites like website content quality.

In e-government websites context, Sharma et al. (2011) stated that the demand for 'Interactive Web applications' have been tremendously accelerated. They added that 'human factors' and 'system usability' are neglected in the majority of e-government developments. They cited statistics which were presented in World Bank Report PTI

(2004) and showed that approximately 35 percent of e-government projects in developing countries are total failures, approximately 50 percent are partial failures, only some 15 percent can be fully seen as successes. They commented that the failure was due to bad interface design (Sharma et al., 2011). According to Zhang and Galletta (2006) who stated that the main aim of Human-Computer Interaction was to boost the usability of systems. Rogers (2004) said that system usability in Human-Computer Interaction played great importance in e-government context for the reason that usability issues can negatively impact huge numbers of people.

2.5.5 Content

Content refers to the degree of which a system user experiences the availability and the accuracy of the needed information in the system and the level of effort required to get it (Brandon-Jones and Carey, 2011; Voss, 2003). Information content determines the value of the information displayed to the system user in the report or inquiry screens and the precision and completeness of the information (Gorla et al., 2010). System users should be provided with the appropriate content that facilitates their work, and they have to access the content easily by using friendly search tools (Brandon-Jones and Carey, 2011). System content was operationalized as one dimension of information system satisfaction (Hou, 2012), in other words, if the user's perception of the level of system content is high, user satisfaction with the system improve.

Information quality is referring to the quality of the output a particular information system can deliver (DeLone and McLean, 1992), which is represented by system reports or virtual screens (Gorla et al., 2010). Several attempts have been made to measure information quality construct; for example, Huh et al. (1990) determined four measurements of information quality : accuracy, completeness, consistency, and currency, while Nelson et al. (2005) have used the dimensions of accuracy, completeness, currency, and format to represent information quality.

In e-procurement system discipline, in addition to the re-designing of the procurement process, content organization is another essential factor for successful e-procurement system implementation (Smeltzer, 2001). The principle concept of e-procurement system is to involve the end-user during the procurement process through a multi-supplier e-catalogue which reduces procedure replication like re-entry of data in the supply chain for requested products or services. Therefore, the provision of product information is crucial in e-procurement. According to Cho and Park (2001), product information quality refers to the extent the information in online system is adequate, up-to-date, clear to understand and consistent with the details the website presents about its products. Gu et al. (2007) remark that low quality information is unproductive since it wastes users' time searching and increases information processing costs. In addition, out-of-date content make it more challenging for users to locate valuable and useful information (Zheng et al., 2012). Higher levels of trust encourage organizations to share accurate and frequent information with partners because of the belief that such information will not be misused but used to benefit both partners (Mishra et al., 2007).

In the online shopping context, Maditinos and Theodoridis (2010) investigated the impact of seven factors on customer satisfaction on post purchase behavior, the factors are : product information quality, user interface quality, service information quality, purchasing process convenience, security perception, product attractiveness, and user’s participation. The researcher collected the data from online shopping users in Greece. The result revealed that product information quality and user interface quality have a significant influence on user satisfaction, while the rest of the factors have only a positive impact. In addition, the investigations showed that customer satisfaction highly impacts post-purchase behavior. This study shows the crucial effect of the quality and availability of products information in online shopping behavior.

2.6 ORDER FULFILMENT QUALITY

Perceived order fulfilment quality refers to suppliers' order fulfilment competencies as seen at receipt by buyers (Vaidyanathan and Devaraj, 2008). Procurement and fulfilment are main processes within the traditional supply chain, and along with the arrival of the internet those processes have been improved by redesigning and reorganizing; moreover, by automating businesses procurement processes, e-procurement system has grown to become progressively renowned for its capability to enhance business operations (Vaidyanathan and Devaraj, 2008). The modern models of procurement and fulfilment benefit from Information and Communication Technology ICT by digitizing particular phases of such functions known as e-procurement system and e-fulfilment (Muffatto and Payaro, 2004). E-fulfilment assists the businesses to meet the needs of customers who are placing a growing number of orders and looking forward to obtaining a faster service despite the physical location (Muffatto and Payaro, 2004). Consequently, this requires higher functionality in the distribution operation of the product (Reynolds, 2001). Brandon-Jones and Carey (2011) point out that order accuracy and the timeliness of delivery depend on the supplier side, and the effectiveness of the capability of e-procurement system leads to improve these areas.

Using e-procurement system in the supply chain enables businesses to utilize the Internet for purchasing both direct or indirect products and services as along with obtaining service quality (Johnson and Whang, 2002). In fact, e-procurement system functions actually exists from the integration between the Internet and supply chain procedures (Vaidyanathan and Devaraj, 2008). Inter-organizational online information flow has greatly improved the significance of this kind of integration to generate powerful supply chains (Johnson and Whang, 2002). Therefore, the superior viewpoint of quality is actually customer's perception of the performance of the service provider (Zavrsnik and Jerman, 2006).

Although many considerations were given to starting robust online businesses, an effortless navigation internet sites, and several ways to attract potential consumers to the internet site, but the failure to serve the customer's order ruined many online suppliers (Rabinovich and Bailey, 2004). Particularly, businesses with high degrees of logistics and service quality, offering a range of qualities like customer service, ordering procedures, order accuracy, order timeliness, order condition, order availability, information quality, and discrepancy handling, are more likely to gain satisfied customers (Mentzer et al., 2001). Procurement and fulfilment are again considered the essential functions in the supply chain, which need renovation and reorganization (Muffatto and Payaro, 2004).

The majority of the studies about order fulfilment service have adopted the service quality research and SERVQUAL measurement scale which was introduced in the marketing context (Parasuraman et al., 1988). Since the SERVQUAL dimensions were used in a number of industry contexts, some researchers preferred to use different scales to assess order fulfilment service (Davis-Sramek et al., 2008). The roots of logistic service quality (LSQ) can be traced back to Perreault and Russ (1976), who retain that logistics functions time, place, and form utility are contributing in boosting product value. Maintaining the improvement of LSQ research, Mentzer et al. (1989) state that delivery service quality comprises customer service quality and physical distribution service quality. Based on Mentzer et al. (1989) LSQ scale, Bienstock et al. Bienstock et al. (1997) designed a scale that can be used to assess the customer perception of physical distribution service quality (PDSQ) by using three dimensions : timeliness, availability, and condition.

In the same vein, in 2001, Mentzer et al. designed logistics service quality LSQ as a process in order to measure the perceptions of customers' logistics service quality LSQ and their satisfaction with logistics services. Throughout their model they tried to expand the service quality domain into logistics service quality LSQ by conceptualizing nine scale dimensions: Information Quality, Ordering Procedures, Ordering Release Quantities, Timeliness, Order Accuracy, Order Quality, Order Condition, then they evaluated the impact of customer perception of these dimensions directly and indirectly on customer satisfaction. The indirect consequences occur when customer perceives logistics outcomes quality, which within their model includes four dimensions: order accuracy, order condition, order timeliness, and order quality. In the following study, Mentzer et al. (2001) associate all these dimensions of LSQ to client satisfaction via a model that reflects the nine dimensions of LSQ as facets of placing and receiving the order.

Order fulfilment processes start from placing orders by buyers and end by delivering the products/services by suppliers (Lin and Shaw, 1998; Pyke et al., 2001). Studies have revealed that the quality in which online retailers fulfill orders is often a substantial determining factor of client satisfaction and retention (Lee and Whang, 2001). Rao et al. (2011) claim that highly effective transfer of goods amongst the online vendor and the client eventually affect clients' decision of performaing another purchase. Under traditional supply chain management, the quality of order fulfilment process can be evaluated by the level of matching the buyers' time and place (Mentzer et al., 1999). Similarly, online order fulfilment depends on the span of time buyers should wait between placing order online and delivering the product or service, and this process depends on the strength of supplier's chain management (Swaminathan and Tayur, 2003).

Nowadays, in many businesses, information systems (e.g., e-procurement) become an essential median by integrating supply chain management to facilitate the work of both buyers and suppliers (Monczka et al., 2008). In total quality management literature, it is obvious that the relationships between buyer and supplier have been recognized as critical to quality (Kaynak, 2003; Rungtusanatham et al., 2005). Boyer and Hult (2006) declare that order quality is a crucial aspect of buying determination and is vital in e-procurement system context. E-procurement system enhances order quality and leverage buyer's satisfaction (Madu and Madu, 2003).

In e-procurement system context, Vaidyanathan and Devaraj (2008) conducted a research based on two theories; ‘Dynamic Capabilities Theory’ and ‘Resource-Based View’. They postulated that on-line information and process can be seen as organizational resources that affect logistics capabilities represented by order accuracy, timeliness, and then satisfaction. The data was collected from 131 managers from purchasing department; the data was analyzed empirically by using structural equation molding. The results revealed that there was a significant relationship between information flow process quality and logistics fulfilment quality processes. In addition, it provided empirical evidence to significant relationship between logistics fulfilment quality processes and e-procurement system satisfaction performance. The study showed that the timeliness had a greater significance than accuracy on e-procurement system satisfaction performance. Thirumalai and Sinha (2005) also mentioned that it is essential to have efficient and effective order fulfilment processes. However, the availability and adequacy of information content and flows between both buyers and suppliers concerning orders have a direct effect on delivery in the supply chain (Heikkilä, 2002).

Griffis et al. (2012) conducted a research by utilizing a theory of customer appraisal, the researcher tried to answer the research question ‘How does order fulfilment performance influence referral behavior in the online retailing marketplace?' In other words they tried to evaluate the impact of order fulfilment cycle time, order fulfilment quality, and product quality on both purchase satisfaction and referral. They find that order fulfilment quality had a greater effect on purchase satisfaction compared with product quality.

In their study Cao et al. (2003) investigated the relationship between online book e-tailer pricing and order fulfilment with customer satisfaction. The results revealed that by offering an acceptable ordering process, e-tailers can relatively improve the negative consequences of higher prices and will possess greater overall scores for fulfilment satisfaction. This is crucial simply because order fulfilment satisfaction results in loyal customers. By logic, higher prices cause negative price satisfaction, but in this study the effects of price satisfaction and fulfilment satisfaction were negative. This strange result offered significant implication for e-tailers planning to compete by cheap prices. A higher level of price satisfaction caused by cheap prices will not positively influence satisfaction in the fulfilment process. This idea was supported by Fisher (1997) who pointed out that when choosing suppliers one must take into account the speed and flexibility, not the low cost.

By using data from 260 online retailers, Rao et al. (2011) investigated the relationship between the quality of online fulfilment and customer retention. They created a model to measure the effect of satisfaction with physical distribution service quality and satisfaction with physical distribution service price on customer purchase satisfaction, and then on customer retention. The results showed positive effect between physical distribution service quality and physical distribution service price on customer purchase satisfaction, which indicated that online retailers can improve the satisfaction performance by improving the price and the quality of physical distribution service.

Among the issues resulting in the failure of e-procurement system is lack of ability to match or exceed buyer expectations in fulfilment (Harrington, 2000). Scholars are still warning that the order fulfilment operation is among the most essential functions for Internet-based vendors (Agatz et al., 2008; de Koster, 2003). In an online retailing context, a number of scholars have implied that evaluations of the order fulfilment process can generate overall satisfaction with purchase transaction (Taylor et al., 2004). Chen and Hitt (2002) consider that Internet retailers who perform better than the competitors in delivering goods or services grow and attract more loyal clients. Previous studies have revealed that logistics service performance played a big role in directing customer satisfaction (Davis-Sramek et al., 2008; Mentzer et al., 2001). Nowadays, it is considered that efficient order fulfilment of stated distribution works as a means of satisfaction and client pleasure (Boyer and Hult, 2006; Rao et al., 2011). According to Fisher (1997), the most crucial determinant when developing worldwide delivery chains was to realize the behavior of demand in a specific market and manage the chain to serve it appropriately. More effective online coordination with associated decreased lead-times will contribute to better performance (Lee et al., 1997).

The empirical results of Leonard and Cronan (2002) reveal that an electronic supply chain is more advantageous than traditional supply chain. However, the electronic supply chain provides the following processes : lower inventory levels, lower inventory carrying cost, fewer stock outs; shorter order cycles, lower prices (costs), and greater availability of products. The use of e-procurement system enables the businesses to digitalize their delivery plans and share wide-ranging of information with suppliers. Consequently, it results in higher usefulness as well as control over the products supplied (Muffatto and Payaro, 2004). E-supply chains aim to consistently enhance the businesses' integrated processes by monitoring the requisition and delivery of products or service electronically (Leonard and Cronan, 2005). Information quality plays an important role in logistics service quality and it indirectly affects customer satisfaction (Mentzer et al., 2001).

2.6.1 Order Delivery Accuracy

Order delivery accuracy refers to how tightly shipments meet clients' orders when received. (Bienstock et al., 1997; Mentzer et al., 2001; Mentzer et al., 1999; Vaidyanathan and Devaraj, 2008). In online context, order accuracy is processing the online order to the exact specification of the customer, which includes place of receipt, quantity, and agreed price of the service (Collier and Bienstock, 2006, p. 265). In other words, order accuracy includes having the right items in the order, the correct number of items and no substitutions for items ordered (Mentzer et al., 2001); this can be guaranteed through powerful processing through the improvement and automation of data entry throughout the procurement process (Lancioni et al., 2000). Order accuracy quality fulfilment depends on the shipment of incorrect items and incorrect shipment quantity (Mentzer et al., 1989). The level of responsiveness and the flexibility of interacting with placed orders can impact customer satisfaction (Naim et al., 2010).

2.6.2 Order Delivery Timeliness

Delivery timeliness refers to whether orders arrive at the customer location when promised (Mentzer et al., 2001, p. 58). It also refers to the length of time between order placement and receipt (Hult, 1998; Hult et al., 2000; Mentzer et al., 2001; Vaidyanathan and Devaraj, 2008). Doll and Torkzadeh (1988) use timeliness as one of the quality determinant that affects user satisfaction. Time-based performance could possibly be described as fast response time (Hout and Stalk, 1990, pp. 28-29). Consequently, time-based delivery performance might in addition have, for example, on-time delivery to customers (Iyer et al., 2004).

From the customer's point of view, online order fulfilment performance mainly includes the order cycle time among setting and receiving of the order by the client, typically assessed in the logistics literature as order timeliness (Griffis et al., 2012). In such cases, the length of time it requires for customers to acquire their products or services, can immediately affect the value determinations of the service quality (Houston et al., 1998). Order timeliness may just be connected with perceptions of quality, giving that order timeliness may also be observed as being dimension of quality when order is receipt from supplier, thus the higher the quality the greater the satisfaction (Vaidyanathan and Devaraj, 2008). Order delivery timeliness has positive impact on the customers (Mentzer et al., 2001; Rafiq and Jafaar, 2007); consequently, delay in fulfilling the service will affect the satisfaction negatively (Davis and Heineke, 1998).

SUMMARY

This Chapter has presented the literature review of the previous studies in the research field. It provides a brief discussion about e-procurement, e-government, and the theoretical background of IT/IS user satisfaction. In addition, this study presented content analysis which focused on the factors that impact user satisfaction in IS field. Further, literature review of system qualities and trust factors was performed.

Chapter 3, discussed the research framework development and hypotheses of the study.

CHAPTER 3

RESEARCH FRAMEWORK AND DEVELOPMENT OF HYPOTHESES

INTRODUCTION

This chapter is divided into two sections. Section One presents the details behind research framework development. Section Two discusses the research hypotheses related to research framework.

3.1 RESEARCH FRAMEWORK

Drawing upon prior literature, using Content Analysis and theoretical basis, this study builds up a research framework to address and recognize research gaps. Throughout the study framework development, evidence is generated from the literature to recognize the relationship between study constructs. Moreover, huge numbers of related studies are collected and analyzed to identify the factors that affect the end-user satisfaction. Along with the evidence that is generated from the previous literature, a research framework is suggested for examining the relationship between the proposed study constructs, as presented in Figure 3.1. Furthermore, hypotheses in line with this research framework are outlined in the following section.

In the same vein, the conceptualization of the research framework is based on the IS Success Model (Delone, 2003; DeLone and McLean, 1992). As user satisfaction is widely recognized as a significant advantage of IS success, understanding factors, including beliefs, expectations and experiences of using the system, which influence user satisfaction, has important implications for organizations. In this study, based on the previous literature, one can conclude that evaluating the success and effectiveness of IT/IS, is still a crucial topic in the Management and IS field. In addition, end-user satisfaction is found to be one of the essential and demanded measures that need to be evaluated to reflect the success and effectiveness of the information systems under mandatory use environment (Brown et al., 2002). Consequently, this study will evaluate the success of the government e-procurement system from the perspective of end-user satisfaction.

Trust toward e-procurement system is a belief. In previous research, trust is described as user's perceptions of the attributes of service providers, including the competency, integrity, and benevolence of the providers (McKnight and Chervany, 2002), (Deng et al., 2010). In our framework, the object of interest is changed to the attributes of e-procurement system. Belief 'trust' is considered as an antecedent to attitude 'satisfaction' (Lu et al., 2012a; Underwood, 2002). Therefore, e-procurement users rely on the belief that the system is acting in their best interests by providing reliable information and executing orders correctly. In the absence of such beliefs, the e-procurement users experience would be plagued by doubts, thus lowering satisfaction levels. In line with this argument, we propose that users, who believe that their system is not aligned with their interests, are frequently dissatisfied. Therfore, this study will introduce trust as a factor that influences e-procurement system success although few studies investigate this relationship.

According to Au et al. (2008), user satisfaction with the e-procurement system can be influenced by a sum of experiences that the user acquires from his interaction with the technology over time. These experiences represent his cognitive evaluation of the entire e-procurement system. Therfore, user satisfaction is used as a method to evaluate reaction or to collect outcomes from the perceptions of e-procurement system users (Lilien et al., 2004). In order to identify end-users' experience related to e-procurement system, a Content Analysis of the factors that influence end-user satisfaction is conducted in Chapter 2. The Content Analysis reveals that the e-procurement system qualities are suitable constructs that influence end-user satisfaction with the e-procurement system. At the same time, there is no consensus about the causal effect between quality measures and user satisfaction. One of the qualities that is found to have influence on end-user satisfaction is perceived e-procurement system quality. The operationalization of this construct is based on the sum of direct user's experiences with the system, service and information attributes of the e-procurement system. Therefore, it is crucial to operationalize the perceived e-procurement system construct to fit e-procurement unique environment. Therefore, e-procurement, as a huge inter-organizational system, needs responsive professional support to assist and support the users. Moreover, e-procurement system demands high capability of processing complex and big quantity of orders and transactions. It also needs frequent and up-to-date training sessions for system users. Accurate and up-to-date content is vital for interchange transactions in e-procurement environment. The usability and flexibility of e-procurement system is vital for handling the massive transactions with less errors. Based on the e-procurement system environment, perceived e-procurement system construct is operationalized by using five dimensions: professionalism, processing, training, content, and usability.

E-procurement system is one of the inter-organizational systems that facilitate the interaction between the two parties, namely buyers and suppliers. Therefore, the e-procurement system user satisfaction can be influenced by indirect experiences with e-procurement system represented by suppliers' performance, as perceived by the buyers in term of order fulfilment quality. Order fulfillment quality is chosen to be operationalized by utilizing two dimensions : order delivery accuracy and order delivery timeliness. The reason behind choosing these dimensions is that the direct system users can evaluate the suppliers' order fulfilment by perceiving and tracking the accuracy and timeliness fulfilment of the placed orders.

In sum, e-procurement system user satisfaction can be evaluated by assessing different types of qualities, perceptions, and attributes represented by e-procurement system quality and order fulfilment quality, as well as beliefs that are based on experiences represented by trust.

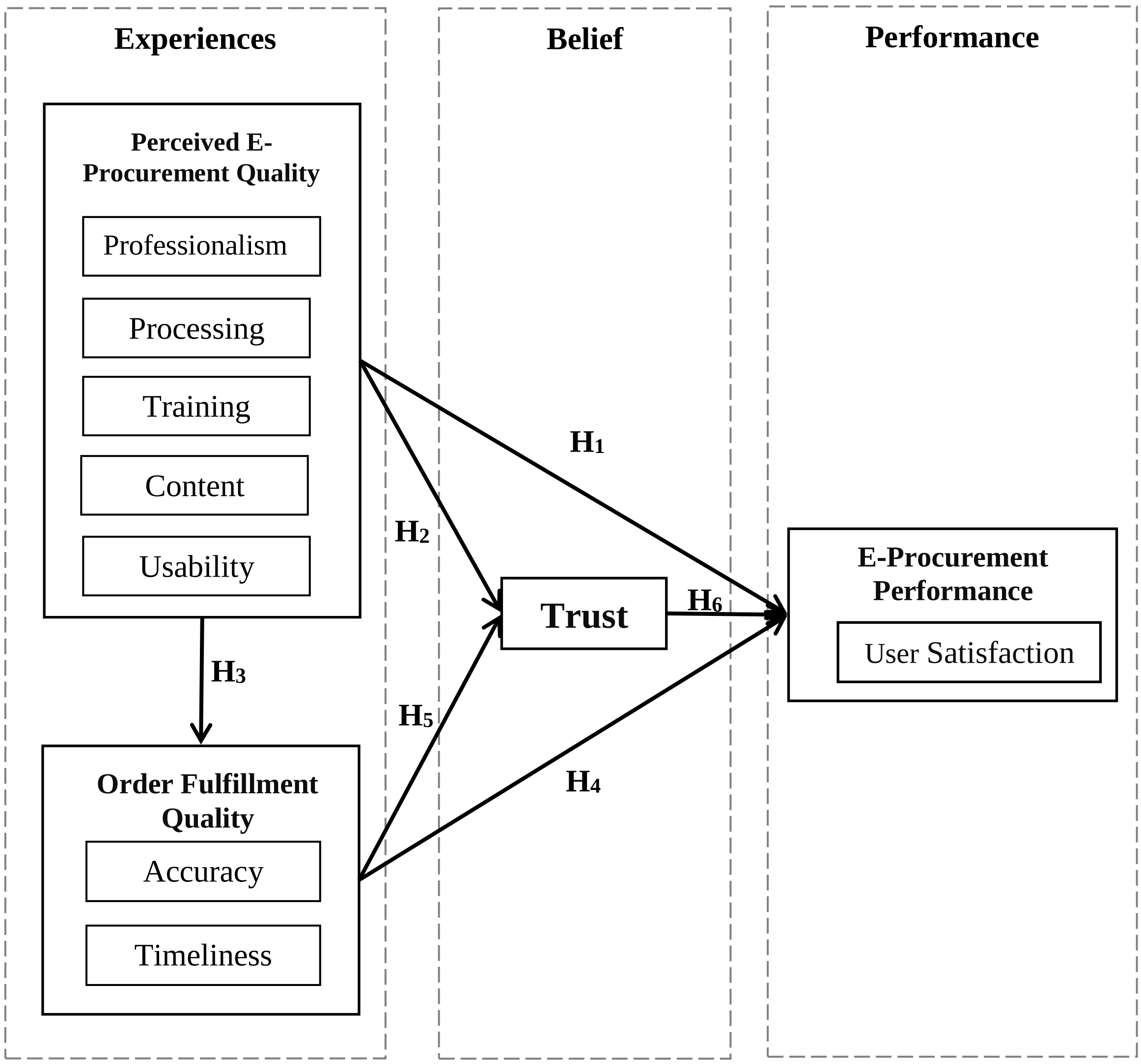


Figure 3.1: Research Framework for E-procurement System End-user Satisfaction

Figure 3.1 presents the study framework for e-procurement system end-user satisfaction along with all the relationships that are proposed with the support from IT/IS literature. The framework of this study suggests a direct relationship between two independent constructs: perceived e-procurement quality and perceived order fulfilment quality with e-procurement system end-user satisfaction. Furthermore, the study framework states that trust could have a direct link with e-procurement system end-user satisfaction. Trust may play the role of mediating the relationship between both perceived e-procurement quality and perceived order fulfilment, and end-user satisfaction. The model proposes the direct relationship between perceived e-procurement quality and perceived order fulfilment quality. The detailed operationalization of study constructs is presented in Chapter 4 Section 4.2.

3.2 RESEARCH HYPOTHESIS

3.2.1 Relationship between Perceived E-Procurement System Quality and End-user Satisfaction

System quality was defined by DeLone and McLean (1992, p. 64) as, "Measures of the information processing system itself," while Wu and Wang (2006) view it as operational features. Perceived quality in general refers to client opinions about an organization's efficiency (Zeithaml and Institute, 1987). Moreover, Delone (2003) highlights that in the IS success model, systems quality measures technical success, information quality measures semantic success, and use, user satisfaction, individual impacts, and organizational impacts measure affective success. In addition, DeLone and McLean (1992) point out that system quality measures are subjective in their nature as they reflect user perception. According to DeLone and McLean (1992), user perceptions of system quality represent ‘actual’ system quality. In user-developed applications context, there is proof that system performance is influenced by system quality (McGill et al., 2003). Poor information content quality may decrease users' satisfaction as they anticipate to get quality information from using e-procurement systems (Zhou, 2013). In the current study, perceived system quality reflects five integated dimensions: professionalism, processing, content, training, and usability. However, from organizational perspective, providing superior system quality to the user is a main concern of organizations (Parasuraman et al., 1988). Throughout the literature, system quality was operationalized in several different ways; however, it had a significant positive relationship with system performance in general and end-user satisfaction in particular (Kassim et al., 2012; Klobas and McGill, 2010; McGill et al., 2003; Wang and Liao, 2008; Zhou, 2013).

H_1: Perceived e-procurement system quality positively influences end-user satisfaction.

3.2.2 Relationship between Perceived E-Procurement System Quality and Trust

As outlined by de Vries (2004), there are three reasons for users to trust a particular system: first, moral obligation of its vendor; the users trust the functionality of the system simply by trusting the vendor, representative or designer of the system. Second, interaction, inadequate interactions with a system negatively affects the trust. Third, experience, positive experience positively affects the trust level, while, negative experience negatively influences the trust. In mandatory use systems, the role of trust plays an important role; therefore, in the absence of system trust users may find alternative ways to conduct their work or their job tasks (Karjalainen et al., 2009). Nicolaou and McKnight (2006) find that perceived information quality had a significant influence on trust and risk, which also had a significant influence on intention to use data exchange between organizations. The study by Kassim et al. (2012) find a significant positive relationship between system quality and trust in the context of students information systems. In information technology artifacts, Vance et al. (2008) find that the perception of system quality had a significant positive influence on user trust. Furthermore, recent study by Zhou (2013) in the context of mobile payment services, supports the influence of system quality on user's trust.

H_2: Perceived e-procurement system quality positively influences trust.

3.2.3 Relationship between Perceived E-Procurement System Quality and Perceived Order Fulfilment Quality

By automating businesses procurement processes, the e-procurement system has grown to become progressively popular for its capability to enhance business operations (Vaidyanathan and Devaraj, 2008). The use of e-procurement system enables the businesses to digitalize their delivery plans and share wide-ranging information with suppliers; therefore, it results in higher efficiency as well as control over the products supplied (Muffatto and Payaro, 2004). Using the e-procurement system in a supply chain enables businesses to utilize the Internet for purchasing both direct or indirect products and services along with obtaining service quality (Johnson and Whang, 2002); thus, it is essential to have efficient and effective order fulfilment processes (Thirumalai and Sinha, 2005). Consequently, the availability and adequacy of information content and flows between both buyers and suppliers concerning orders have a direct effect on delivery in the supply chain (Heikkilä, 2002). Harrington (2000) points out that among the issues resulting in the failure of e-procurement is the lack of ability to match or exceed buyer expectations in fulfilment.

H_3: Perceived e-procurement system quality positively influences perceived order fulfilment quality.

3.2.4 Relationship between Perceived Order Fulfilment Quality and End-user Satisfaction

In the current study, order fulfilment quality contains two dimensions : order accuracy and order timeliness. Brandon-Jones and Carey (2011) point out that order accuracy and the timeliness of delivery depend on the supplier side, and the effectiveness of the capability of e-procurement system lead to improve these areas. According to Pyke et al. (2001), the order fulfilment function basically starts when a buyer decides to purchase up to the product or service shipped to the buyer; thus, the quality of this function affects buyer perception and satisfaction. Furthermore, order fulfilment requires high functionality in the distribution operation of the product (Reynolds, 2001). According to Mentzer et al. (2001), businesses achieve customer satisfaction when provided high degrees of logistics service qualities such as customer service, ordering procedures, order accuracy, order timeliness, order condition, order availability, information quality, and discrepancy handling. Inter-organizational online information flow has improved the significance of this kind of integration to generate powerful supply chains (Johnson and Whang, 2002). Several studies reveal that the proficiency of online retailers in fulfilling orders is often a substantial factor that impact client satisfaction and retention (Lee and Whang, 2001). Rao et al. (2011) claim that highly effective transfer of goods amongst the online vendor and the client eventually affect clients' decision of performaing another purchase. e-procurement system improves order quality and improves buyer's satisfaction (Madu and Madu, 2003). Order fulfilment quality influences system performance (Griffis et al., 2012; Rao et al., 2011).

H_4: Perceived order fulfilment quality positively influences end-user satisfaction.

3.2.5 Relationship between Perceived Order Fulfilment Quality and Trust

Blomqvist (1997, p. 283) emphasize that, "trust is based on experiences." In an online environment, trust is developed when a buyer has positive experience with the supplier by means of things such as order fulfilment, service, and product quality (Urban et al., 2009). Positive experience positively affects the trust level while negative experience negatively influences the trust (de Vries, 2004); furthermore, suppliers order fulfilment is one of the experiences that is perceived by an e-procurement system user. Distrust also indicates violations of buyer expectations (Zhang et al., 2011). Schwind et al. (2011) identify the lack of e-fulfilment and the lack of trust as the major issues in online environment. Gupta et al. (2009) point out that the buyers form trust perceptions simply by assessments of the seller's related task performance. When a buyer's perception of supplier order fulfilment is high, the buyer believes that the supplier has the strength and appropriate capabilities related to order fulfilment and is assured that he/she will receive the product on time. This consequently, improves his/her satisfaction and trust (Chiu et al., 2010; Zhang et al., 2011). Pillai et al. (2001) debate that, when outcome distributions are viewed honest, greater levels of trust are likely to occur. To put it differently, a buyer's trust in the supplier will be developed once the product is delivered accurately, on time, and has high quality. Bart et al. (2005) find that order fulfilment is the dominant factor that affected trust in the online travel services context. Furthermore, superior performance of order fulfilment is expected. If this expectation is not fulfilled, trust might decline. As pointed out by Morgan and Hunt (1994a), the presence of trust and relationship commitment in business relationships is crucial; moreover, it improves the collaboration and reduces uncertainty between the parties. Doney and Cannon (1997) mention that trust is crucial in inter-organizational exchanges in the way that it reflects interpersonal behavior.

H_5: Perceived order fulfilment quality positively influences trust.

3.2.6 Relationship between Trust and End-user Satisfaction

In this study, trust is determined by the belief in the system characteristics, information, and the honesty of the suppliers (Kini and Choobineh, 1998; Sambasivan et al., 2010). Belief is considered antecedent to attitude (Lu et al., 2012a; Underwood, 2002). Trust is a result of a system user's acceptance; consequently, it impacts system user satisfaction (Kassim et al., 2012; Lu et al., 2012a; Wu and Chen, 2005). In addition, it is a critical key that plays a significant role in predicting users' behavior in IS context (Gefen et al., 2003; Mahmood et al., 2004). Jarvenpaa et al. (2000) argue that trust impacts the attitude like satisfaction and risk perception. Geyskens et al. (1998) state that satisfaction is a critical trust outcome. Lu et al. (2012a) report the positive relationship between trust and user satisfaction in C2C platform. Kusuma and Pramunita (2011) state that in e-procurement systems users tend to refuse using the system because of its risk and untrustworthiness. As pointed out by Morgan and Hunt (1994a), the presence of trust and relationship commitment in business relationships is crucial; thus, it improves the collaboration and reduces uncertainty between the parties. Doney and Cannon (1997) point out that trust is crucial in inter-organizational exchanges in the way that it reflects interpersonal behavior. The lack of trust in e-procurement systems has been presumed as the main reason for resistance of users to use the systems (Kusuma and Pramunita, 2011). Mahmood et al. (2004) state that trust is an important variable which can influence online customer behavior.

H_6: Trust positively influences end-user satisfaction.

3.2.7 The Mediating Effect of Trust

System quality should positively affect system outcomes, as proposed by DeLone and McLean (2003). High level of experience with the system affects e-procurement system satisfaction, for example, e-procurement system quality and order fulfilment quality provide a strong message to the user that the operation will be executed correctly and thus should impact and satisfy the potential future exchange use. The mediation effect of trust was proven by several scholars. The study by Sultan et al. (2002) reveals that trust mediated the relationship between two independent variables web site characteristics, consumer characteristics, and the dependent variable consumer behavioral intent. Other studies in the context of inter-organizational electronic exchanges show that the relationship between perceived information quality and intention to use is mediated by trusting beliefs (Nicolaou and McKnight, 2006). Furthermore, Choon et al. (2011) hypothesize that the relationship between perceived technology and online purchase intention is mediated by trust; the results of the study supported the relationship. Trust shows a mediating effect between antecedents just like environment uncertainty and consequences like satisfaction in a relationship marketing context (Geyskens et al., 1999). Another study by Singh and Sirdeshmukh (2000) shows a mediation effect of trust between agency mechanisms and satisfaction. Recently, Kassim et al. (2012) investigate the mediation effect of trust between system acceptance variables and end-user satisfaction; most importantly, trust is found to have a mediating effect between system acceptance variables and satisfaction. After performing an indepth literature review we found only one study investigates the mediating effect between system quality and user satisfaction (Kassim et al., 2012). From literature review, no previous study tested the mediation effect of trust between order fulfilment quality and e-procurement system user satisfaction

H_7: Trust mediates the relationship between perceived e-procurement system quality and end-user satisfaction.

H_8: Trust mediates the relationship between perceived order fulfilment quality and end-user satisfaction.

SUMMARY

This Chapter has presented the development of study framework. In addition, it discussed the research hypotheses related to study framework. The next chapter, Chapter 4, will discuss the research methodology of this study.

CHAPTER 4

RESEARCH METHODOLOGY

INTRODUCTION

This chapter represents the research method adopted in this study. This chapter is divided into three sections. Section one presents an overview of research design and paradigm; in addition, it provides an overview of the research process. Research process comprises three phases: research model and measures development, a field study survey, and the study outcome and conclusion. The second section discusses the measurement development and validation process. The last section provides details on the field survey, including the determination of the information system and study sample, administration of survey instrument, exploratory factor analysis for research model constructs, and finally details in selecting the suitable data analysis technique for this study.

4.1 OVERVIEW OF RESEARCH DESIGN AND PARADIGM

Each research has a purpose; to achieve its purpose appropriate methods must be chosen. "Science is an enterprise dedicated to find out. No matter what you want to find out, though, there will likely be many ways of doing it" (Babbie, 2007, p. 87). Yin (2003) stated that each study has an implied, or even explicit, research design. Study design is crucial to any research; it forms a plan of how research questions will be answered (Saunders et al., 2009, p. 136). Research design is a rational and reasonable procedure that is formulated to generate quality findings.

In any research it is essential for the researcher to demonstrate his or her most fundamental beliefs concerning the nature of the world. The way the researcher views the world will have a remarkable influence on the way he or she views the topics and phenomena, influence the technique of collecting data, and the means by which the outcomes are understood (Alexander, 2002). Babbie (2007) pointed out that both theories and paradigms are intertwining concepts, while theories explaining phenomena and paradigms "provide ways of looking." Paradigm refers to "the fundamental models or frames of reference we use to organise our observations and reasoning" (Babbie, 2007, p. 31). Research philosophy/paradigm is the underlying logic of the methods used in scientific research and it explains the best way the researchers conduct this (Jones, 2011). Furthermore, research philosophy is recognised as ontology "what exists" and epistemology " what can be known and how can we know it?" (Jones, 2011, p. 91).

Chen and Hirschheim (2004, p. 201) considers positivists as those who believe that "reality exists objectively and independently from human experiences" and those who are concerned with the "hypothetic-deductive testability of theories." According to Bryman and Bell (2007), positivism has some principles; firstly, only phenomena that are confirmed by the senses can be accepted as knowledge. Secondly, theories are deduced and used to generate hypothesis that can be examined to provide explanations, and thirdly, science is conducted in a value free manner.

This study attempts to investigate the factors that influence e-procurement system user satisfaction, which is a social and universal phenomena. Therefore, this research is adopting a positivist perspective. Quite simply, end-user satisfaction as a form of human attitude is one of the social realities that can be objectively measured by employing standard scientific methods by third parties who work as real observers. For that reason, this study is utilising a quantitative deductive methodology followed by empirical evaluation.

It is worthwhile to connect research paradigm with a suitable research approach. Deductive approach is explained under positivism; it is suitable for testing theories by collecting quantitative data (Saunders et al., 2009). As mentioned earlier, the nature of this study lies under the positivist paradigm; according to Robson (2002), several procedures are essential to be followed to achieve the deductive approach, and they are: theory, forming hypothesis, data collection, findings, and hypotheses confirming or rejecting revision of theory.

This research is a form of descriptive-explanatory study, because this study aims to investigate e-procurement system performance by measuring the end-user satisfaction; thus, this study would be analysing the casual relationships between the proposed constructs; perceived e-procurement system quality, perceived order fulfilment quality, trust, and e-procurement system user satisfaction. Robson (2002) stated that the objective of exploratory studies is to discover what is happening; to find the latest knowledge, to analyze phenomena in an innovative perspective, while the objective of descriptive studies is to reflect a precise profile of individuals, occasions, or even situations. Explanatory studies investigated the causal relationships between study constructs (Saunders et al., 2009).

Research strategy is determined by research questions and objectives (Saunders et al., 2009). The aim of this study is to build a model that represents the relationships between the factors that influence e-procurement system user satisfaction. For this reason, survey strategy (along with questionnaire technique), is found to be the suitable strategy for the current study. Survey is regularly used and considered a common strategy under the deductive approach and business research; moreover, scholars usually use surveys to answer who, what, where, how much, and many other questions (Saunders et al., 2009). According to Saunders et al. (2009), survey strategy can be adopted in research for five reasons: firstly, it provides the ability to collect a large quantity of data in a very cost-effective way. Secondly, it facilitates collection of data from a sample and uses the findings as representation of the whole research. Thirdly, the standardised nature of the data facilitates and eases the comparison between it. Fourthly, it provides the researcher the ability to collect quantitative data that can be tested, analyzed, and interpreted in a descriptive and statistical way. Finally, the data collected by using survey strategy can be utilised to indicate rationale of specific effects and relationships between constructs, and facilitates the formation of new models representing these relationships.

The current study adopts cross-sectional time horizon. It is found to be the best choice to evaluate e-procurement system end-user satisfaction. Many scholars adopt cross-sectional time horizon to investigate similar phenomenon, such as, organisational performance and user satisfaction (Chatzoglou and Diamantidis, 2009; Vaidyanathan and Devaraj, 2008). Furthermore, cross-sectional studies deal with observations of a phenomenon or sample population at a particular time (Babbie, 2007). Exploratory, descriptive, and explanatory studies are often cross-sectional studies (Babbie, 2007).

Therefore, the final research design is presented in Figure 4.1, comprising three main phases; Phase I, commences by reviewing the previous literature in detail, and highlights the theories underpinning the phenomena. Based on the literature, the research model is formulated and suitable measures are selected. Then, pre-testing and pilot testing of the measures are executed to provide further validation and stability before proceeding to phase II. Phase II starts by surveying the research population, then a questionnaire is collected from direct end-users of ePerolehan 'e-procurement' system. Then, a hypothesis is formulated using structural equation modeling (PLS-SEM). Statistical results were generated by executing measurement and a structural model. Phase III contains the results of the survey data and the conclusion of the study.

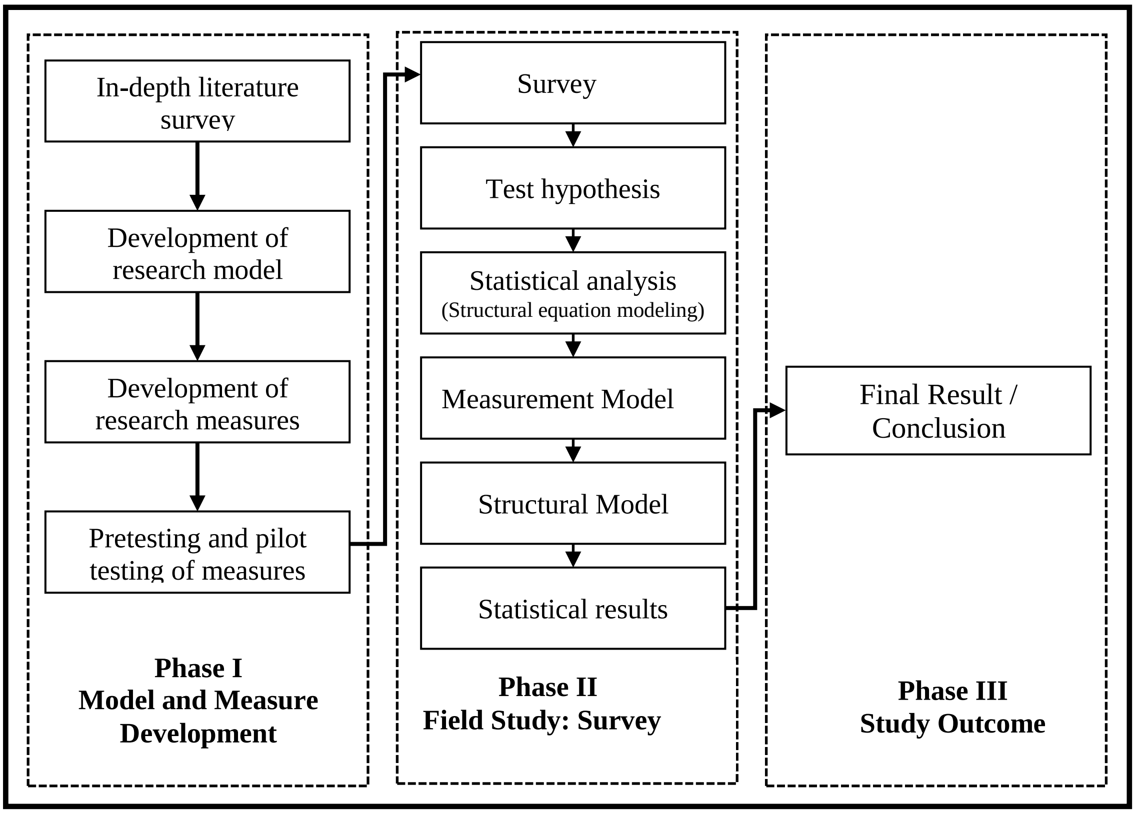


Figure 4.1: Research Process

4.2 PHASE I: RESEARCH MODEL AND MEASURES

After exploring the previous literature related to the study field, the research model was developed and presented in Chapter 3. The following sections will provide details for the development and validation of study measures.

4.2.1 Measures Development and Validation

Development of Study Constructs

This thesis used a systematic way to develop the study constructs. The previous literature review formed the main basis for all proposed constructs' operationalisation as well as the causal relationships between them. Consequently, the measures for this study were adopted from previous literature, while Chapter 2 explored the core studies in the disciplines of information systems in general and e-procurement system in particular. This study used multi-dimensions and/or multi-item measures to evaluate research framework constructs that were discussed earlier in Chapter 3. Additionally, multi-items within each construct were developed and adapted from existing scales previously validated within IS literature. In this study, all items were measured using a 7-point Likert scale with anchors ranging from (1) strongly disagree to (7) strongly agree, to evaluate all proposed constructs in this study. For further validation, the constructs passed through several validation stages by review and testing by a panel of experts, field and academic experts and practitioners, and its results will be presented in the following sections.

Scholars provide some rationales toward recommending the use of hierarchical latent variable models more than the use of models composed completely of lower-order dimensions (e.g., Johnson et al., 2012; Wetzels et al., 2009). Therefore, the supporters of the utilisation of higher-order constructs have stated that the constructs allow for more theoretical parsimony and decreased model complexity (Edwards, 2001). Additionally, hierarchical-models facilitate the matching level of abstraction for predictor and criterion variables in conceptual models (Edwards, 2001). Law et al. (1998, p. 749) pointed out that "treating dimensions as a set of individual variables precludes any general conclusion between a multi-dimensional construct and other constructs." It is important to point out that a major criteria for defining and operationalising multi-dimensional constructs is the criteria that they need to be based on theory, and the theory should suggest the number of dimensions as well as their relationship with the higher-order construct (Edwards, 2001; Johnson et al., 2012).

On the other hand, scholars usually concentrate on the structural model more than the relationship between measures and their related constructs (Jarvis et al., 2003). This limited concern about the measurement model has directed many researchers to treat all constructs in the same way whether a particular construct is formative or reflective (Chin, 1998; Jarvis et al., 2003). In fact, the relationships among the constructs and their measures need to be viewed as hypotheses that require evaluation along with structural paths (Edwards and Bagozzi, 2000). For that reason, the misidentification of the formative and reflective constructs may lead to type I and type II errors which may have negative impact on theory advancement, due to the generation of inappropriate outcomes (Edwards and Bagozzi, 2000). Furthermore, Jarvis et al. (2003) listed the main four decision rules to identify formative and reflective constructs, as shown in Table 4.1.

Table 4.1: Decision Rules to Identify Construct as Formative or Reflective

	Formative model	**Reflective model**
1. Direction of causality from construct to measure implied by the conceptual definition Are the indicators (items) (a) defining characteristics or (b) manifestations of the construct? Would changes in the indicators/items cause changes in the construct or not? Would changes in the construct cause changes in the indicators?	• Direction of causality is from items to construct • Indicators are defining characteristics of the construct • Changes in the indicators should cause changes in the construct • Changes in the construct do not cause changes in the indicators	• Direction of causality is from construct to items • Indicators are manifestations of the construct • Changes in the indicator should not cause changes in the construct • Changes in the construct do cause changes in the indicators
2. Interchangeability of the indicators/items Should the indicators have the same or similar content? Do the indicators share a common theme? Would dropping one of the indicators alter the conceptual domain of the construct?	• Indicators need not be interchangeable • Indicators need not have the same or similar content/ indicators need not share a common theme • Dropping an indicator may alter the conceptual domain of the construct	• Indicators should be interchangeable • Indicators should have the same or similar content/ indicators should share a common theme • Dropping an indicator should not alter the conceptual domain of the construct
3. Covariation among the indicators Should a change in one of the indicators be associated with changes in the other indicators?	• Not necessary for indicators to covary with each other • Not necessarily	• Indicators are expected to covary with each other • Yes
4. Nomological net of the construct indicators Are the indicators/items expected to have the same antecedents and consequences?	• Nomological net for the indicators may differ • Indicators are not required to have the same antecedents and consequences	• Nomological net for the indicators should not differ • Indicators are required to have the same antecedents and consequences

(Source: Jarvis et al., 2003)

Based on the previous discussion and in line with the development of study constructs in a systematic way (see Figure 4.2), the researcher will first define each construct, then list construct operationalisation and validated measurement based on literature. Following that, the researcher will identify whether each construct is formative or reflective based on the decision rules criteria (Jarvis et al., 2003). The list of research model constructs, their definitions, operationalisation, and the relevant literature are presented in Table 4.2.

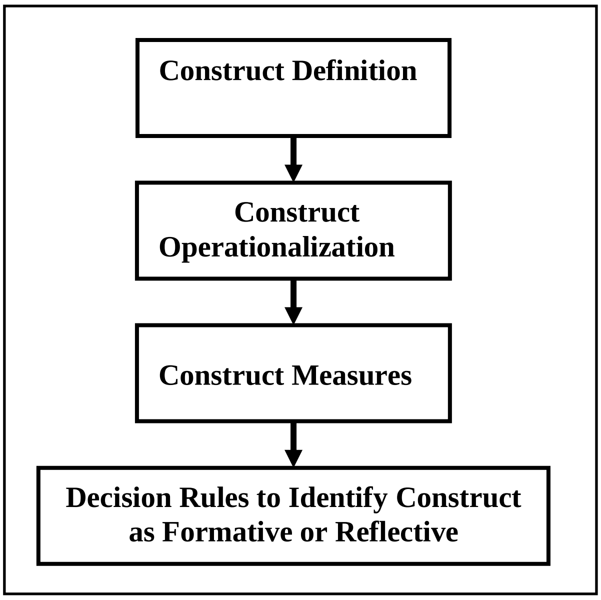


Figure 4.2: Constructs Development Process

Table 4.2: Measurement of Study Model Constructs

Construct	Definition	Measure	Source
End-user satisfaction	IS end-user's overall affective and cognitive evaluation of the pleasurable level of consumption-related fulfilment experienced with the IS	• Pleasure of using the system on work • Satisfying interaction with the system	Au et al. (2008) Palvia (2009) Wixom and Todd (2005)
Trust	Degree to which system user has positive belief in the system characteristics, information and the honesty of the suppliers.	• Reliability of the system • Trust information and system • Trust the suppliers	Chang and Wong (2010b) Bélanger and Carter (2008) Lemire et al. (2008) Sambasivan et al. (2010)
Perceived e-procurement system quality	System user perception and experiences with e-procurement system in terms of professionalism, processing, training, content, usability	Dimensions: • Professionalism • Processing • Training • Content • Usability	Brandon-Jones and Carey (2011) Brandon-Jones (2006)
Perceived order fulfilment quality	Degree to which system user experienced suppliers' order fulfilment competencies as seen at order receipt	Dimensions: • Accuracy • Timeliness	Vaidyanathan and Devaraj (2008)

4.2.1.1 End-user Satisfaction

End-user satisfaction is defined as e-procurement system "end-user's overall affective and cognitive evaluation of the pleasurable level of consumption-related fulfilment experienced with" e-procurement system (Au et al., 2008, p. 46). Evaluating user satisfaction (or dissatisfaction) with the use of a particular system, mirrors to which level system capabilities effectively (or ineffectively) fulfils their work requirements (Au et al., 2008; Gelderman, 1998).

In the previous studies, user satisfaction was conceptualised in several ways; single-item measure (Kanellou and Spathis, 2013), multi-dimensional measure (Lai, 2006), and multi-items measure (Au et al., 2008). Using single-item measure for assessing satisfaction has been criticised due to the possibility of incurring a critical measuring error (Zviran and Erlich, 2003). Some scholars used different product and/or service attributes to operationalise the end-user satisfaction construct. This method has caused confusion because the attributes were frequently considered as factors influencing end-user satisfaction, instead of measures of end-user satisfaction themselves (Au et al., 2008). As an example, Rai et al. (2002) declared that user satisfaction could be assessed indirectly via information quality, system quality, and also other variables. A number of items in the satisfaction measurement commonly map items measuring the system quality and information quality (Gable et al., 2003). As specified previously, overall end-user satisfaction refers to affective and cognitive assessment of the overall e-procurement system user experience. Therefore, its measure has to reflect individual emotions along with cognition (Au et al., 2008).

Thus, to operationalise and measure end-user satisfaction, this study adopts three items that reflect user emotions and cognitions from Palvia (2009) and Wixom and Todd (2005). The final three items were developed to assess the user's level of pleasure in using and interacting with the e-procurement system, in addition to the overall satisfaction shown in Table 4.3.

Table 4.3: Items Used for Measuring Satisfaction

#	Items
1	I am very pleased with using e-procurement system in my work.
3	My interaction with e-procurement system is very satisfying.
2	All things considered, I am very satisfied with e-procurement system.

Source: Items (1,3) Palvia (2009), Item (2) Wixom and Todd (2005)

End-user satisfaction construct was reviewed and validated by a panel of experts (see section 4.2.2). The construct was also subjected to an internal reliability analysis based on the pilot test (see section 4.2.3). The reliability of this construct, as represented by Cronbach's Alpha, was reported to be 0.835 (see Table 4.26), which indicates acceptable internal reliability (Cavana et al., 2001).

Based on the decision rules in Table 4.1, the analysis of end-user satisfaction measures based on the decision rules are displayed in Table 4.4. In line with previous research, this study will consider end-user satisfaction as a first order reflective construct (Au et al., 2008; Palvia, 2009; Wixom and Todd, 2005).

Table 4.4: Decision Rules to Identify E-Procurement System End-user satisfaction Construct as Formative or Reflective

Criteria	Construct Analysis	Decision	
		Formative	**Reflective**
Rule1: Direction of causality from construct to measure implied by the conceptual definition	E-procurement system end-user satisfaction measures are considered manifestations of the construct, thus changes in the item will not cause change in the construct.		√
Rule2: Interchangeability of the indicators/items	All measurement items are interchangeable, all the items have the same content (pleasured, satisfied), moreover, dropping one of the measures will not affect the construct.		√
Rule3: Covariation among the indicators	The indicators covary, thus the increase in pleasure of using the system will lead to the increase the satisfaction with system interaction.		√
Rule4: Nomological net of the construct indicators	All the indicators would have the same antecedents and consequences as all of them reflect the similar content.		√
Final Decision	**E-procurement system end-user satisfaction is a first order reflective construct**		√

4.2.1.2 Trust

Trust is the degree to which a system user has positive belief in the system characteristics, and in the information and the honesty of the suppliers (Kini and Choobineh, 1998; Sambasivan et al., 2010). Sambasivan et al. (2010) developed and validated the measure of trust under the e-procurement system based on a review of trusting suppliers who were using the system. Other scholars developed measures to evaluate trust from system and information perspectives (Bélanger and Carter, 2008; Lemire et al., 2008). In this study, trust is operationalised from previous studies (Bélanger and Carter, 2008; Chang and Wong, 2010a; Gefen et al., 2003; Lemire et al., 2008; Sambasivan et al., 2010). The study reflects trusting the system as well as the suppliers who are using the system.

To operationalise and measure trust, this study adopts construct measures (Bélanger and Carter, 2008; Chang and Wong, 2010a; Lemire et al., 2008; Sambasivan et al., 2010). The final six items were developed to assess users' trust toward the e-procurement system, as well as the suppliers who are using the system as presented in Table 4.5.

Table 4.5: Items Used for Measuring Trust

#	Items
1	The e-procurement system is reliable.
2	The information available on the e-procurement system is trustworthy.
3	The e-procurement system can be trusted to carry out online transactions faithfully.
4	From my experience, e-procurement system is trustworthy.
5	Our suppliers are honest in dealing with us at all times.
6	Our suppliers keep their promises and commitments.

Source: Item (1) Chang and Wong (2010a), Item (2) Lemire et al. (2008), Items (3,4) Bélanger and Carter (2008), Items (5,6) Sambasivan et al. (2010)

Trust construct was reviewed and validated by the panel of experts (see section 4.2.2). The construct was also subjected to an internal reliability analysis based on the pilot test (see section 4.2.3). The reliability represented by Cronbach's Alpha of this construct was reported to be 0.792 (see Table 4.26), which indicated acceptable internal reliability (Cavana et al., 2001).

Based on the decision rules in Table 4.1, the analysis of trust measures based on the decision rules are displayed in Table 4.6. All rules criteria were fulfilled as reflective construct except the interchangeability between measures, trust can be seen as reflective within each group and formative between groups at the same time. Petter et al. (2007) pointed out that the majority of criteria are true, the theory-based view can consider the type of the construct. Previous studies evaluated trust as reflective construct (Chang and Wong, 2010a; Gefen et al., 2003). This study will consider trust as the first order reflective construct.

Table 4.6: Decision Rules to Identify Trust Construct as Formative or Reflective

Criteria	Construct Analysis	Decision	
		Formative	**Reflective**
Rule1: Direction of causality from construct to measure implied by the conceptual definition	Trust construct measures are considered manifestations of the construct, thus changes in the item will not cause change in the construct.		√
Rule2: Interchangeability of the indicators/items	The items can classify into two groups (1-4) and (5-6) each group within each group the items are interchangeable, each group has the same content trust (system, suppliers), moreover, dropping one of the measures/ group items will not affect the construct.	√	√
Rule3: Covariation among the indicators	The indicators covary, thus the increase in trusting suppliers will positively affect trusting the system.		√
Rule4: Nomological net of the construct indicators	All the indicators would have the same antecedents and consequences as all of them reflect the similar content.		√
Final Decision	**Trust is a first order reflective construct**		√

4.2.1.3 Perceived E-Procurement System Quality

Perceived e-procurement system quality is defined as user perception and experience with e-procurement system in terms of professionalism, processing, training, content, and usability (Brandon-Jones, 2006; Brandon-Jones and Carey, 2011). Brandon-Jones believes that perceived e-procurement system quality is a combination of information system quality, internal service quality, and e-service quality. Perceived e-procurement system quality was first conceptualised by Brandon-Jones (2006) in six dimensions; professionalism, processing, training, content, usability, and specification. This study uses five dimensions that form perceived e-procurement system quality (Brandon-Jones, 2006). The researcher dropped the 'specification' dimension which was operationalised in Brandon-Jones study, such as the perception of system functionality like integration ability with other financial systems, the capability to reconcile invoices, and the ability to configure the system. The rationale for dropping the 'specification' dimension from the current study is that this dimension was noticed to suffer from high missing data in the main study; in addition, its items can be answered by high level users but not operational level users. Specification items show that this particular dimension is probably not appropriate to end system users (Brandon-Jones, 2006). Moreover, the decision of dropping this construct was recommended by ePerolehan Deputy Director whom participated in pre-testing validity of the measures (see section 4.2.2). She mentioned that the questions related to 'specification' dimension was difficult to be answered by system end-users.

However, most of prior studies dealt with information systems quality as one first-order construct, and were focused on recognising individual items (Ives et al., 1983; Larcker and Lessig, 1980; Swanson, 1982). Other studies measured information systems quality as a second-order construct consisting of several first-order dimensions, such as, three main well-known scales; End-User Computing Satisfaction (EUCS) by Doll and Torkzadeh (1988), User Information Satisfaction (UIS) by Baroudi and Orlikowski (1988), and Information Systems Success Model (ISS) by DeLone and McLean (1992).

To operationalise and measure perceived e-procurement system quality, this study adopts five dimensions of perceived e-procurement system quality from previous research (Brandon-Jones, 2006). The reason behind choosing perceived e-procurement system quality measures from Brandon-Jones is that the perceived e-procurement system quality construct was developed and tested under the e-procurement system, and thus, it reflected the uniqueness of this system. In addition, it presents all system qualities in one construct contrary to other studies that operationalised system, information, and service qualities separately (Chiu et al., 2007; Dwivedi et al., 2013; Klobas and McGill, 2010). Details of each of the perceived e-procurement system quality five dimensions are provided below in Table 4.7.

Based on the decision rules and construct measures analysis, which is displayed in Table 4.8, the current study hypothesises that the perceived e-procurement system quality is a second-order formative construct consisting five dimensions; professionalism, processing, training, content, and usability (Brandon-Jones, 2006; Brandon-Jones and Carey, 2011).

Table 4.7: Measurement of Perceived E-procurement System Quality Constructs

Construct	Definition	Measure	Source
Professionalism	Degree to which system user experience the continual support from procurement division.	Evaluate procurement division • Availability • Pay Attention and Responsiveness • Flexibility • Knowledgeable • Effective solutions • Confidentiality • Friendly	Brandon-Jones and Carey (2011)
Processing	Degree to which system user experience system capability to manipulate, deal and execute procurement transactions from placing an order until it reaches the supplier.	• Efficient authorization process • Processing complex orders • Secure • System Capabilities to ensure order transactions	Brandon-Jones and Carey (2011)
Training	Degree to which the system users experience adequate, specific timely training, to which degree the training influences users work.	• Timely and specific training • Adequate training information • Training influences	Brandon-Jones and Carey (2011) Amoako-Gyampah and Salam (2004)
Content	Degree to which system user experience the availability and the accuracy of the needed information in the system and the level of effort required to get it.	• The adequacy and sufficiency of uploaded information • Needed efforts to reach the information • Information accuracy	Brandon-Jones and Carey (2011) Hou (2012) Voss (2003)
Usability	Degree to which system user experience and perceive ease of use, interaction flexibility and navigation around an e-procurement system	• Interaction flexibility • Mastering system use • Navigation evaluation • Availability • Ease of use	Davis (1989) Brandon-Jones and Carey (2011) Davis (1989)

Table 4.8: Decision Rules to Identify Perceived E-procurement System Quality Construct as Formative or Reflective

Criteria	Construct Analysis	Decision: Formative	Decision: Reflective
Rule1: Direction of causality from construct to measure implied by the conceptual definition	Perceived e-procurement system quality construct measures are defining the characteristics of the construct, thus changes in the dimensions will cause change in the construct, and the change in the construct will not affect the dimensions.	√	
Rule2: Interchangeability of the indicators/items	The five dimensions are not interchangeable, the dimensions are distinct from each other they are not representing the same content, e.g., training is totally distinct from processing and usability. Dropping any of the dimensions alter the conceptual domain of the construct	√	
Rule3: Covariation among the indicators	The five dimensions are not covary with each other, e.g., the increase in content dimension will not lead to any increase in training dimension.	√	
Rule4: Nomological net of the construct indicators	Each dimension would have the different antecedents and consequences as all of them reflect the different content.	√	
Final Decision	**Perceived e-procurement system quality is a second order formative construct**	√	

A. Professionalism

Based on prior studies, professionalism refers to the degree to which system users experience the continual support from procurement division (Brandon-Jones, 2006; Brandon-Jones and Carey, 2011). There are three types of technical support; technical assistance that is provided by an IT unit, technical consultation that is offered by vendors or partners, and technical instructions like training for employees and the providence of related manuals and references (Hult, 1998; Igbaria et al., 1997).

To operationalise and measure professionalism, this study adopts the construct measures from Brandon-Jones (2006). The final nine items were developed to evaluate procurement division availability, paying attention and responsiveness, knowledgeable, flexibility, and effective problem solutions, confidentiality, and friendliness from the perspective of system users as presented in Table 4.9.

Table 4.9: Items Used for Measuring Professionalism

#	Items
1	The procurement division is always available to deal with my queries or problems.
2	The procurement division always gets back to me when they say they will.
3	The procurement division responds quickly to my queries or problems.
4	The procurement division is flexible when dealing with unusual requests or problems.
5	The procurement division is knowledgeable in dealing with my queries or problems.
6	The procurement division deals effectively with any problems.
7	The procurement division deals confidentially with my queries or problems.
8	The procurement division shows concern when dealing with my queries or problems.
9	The procurement division is friendly when dealing with queries or problems.

Source: Brandon-Jones (2006)

Professionalism construct was reviewed, and validated by a panel of experts (see section 4.2.2). The construct was also subjected to an internal reliability analysis based on the pilot test (see section 4.2.3). The reliability represented by Cronbach's Alpha of this construct was reported to be 0.913 (see Table 4.26), which indicates acceptable internal reliability (Cavana et al., 2001).

Based on the decision rules in Table 4.1, the analysis of professionalism measures based on the decision rules are displayed in Table 4.10. In line with previous research by Brandon-Jones (2006), this study will consider Professionalism as first-order reflective construct.

Table 4.10: Decision Rules to Identify Professionalism Construct as Formative or Reflective

Criteria	Construct Analysis	Decision	
		Formative	Reflective
Rule1: Direction of causality from construct to measure implied by the conceptual definition	Professionalism measures are considered manifestations of the construct, thus changes in the items will not cause change in the construct.		√
Rule2: Interchangeability of the indicators/items	All measurement items are interchangeable, all the items have the same content support and solving problems; moreover, dropping one of the measures will not affect the construct.		√
Rule3: Covariation among the indicators	The indicators covary with each other, thus the more knowledgeable the more effective and confidential and flexible in providing solutions.		√
Rule4: Nomological net of the construct indicators	All the indicators would have the same antecedents and consequences as all of them reflect the similar content.		√
Final Decision	**Professionalism is a first order reflective construct**		√

B. Processing

Processing is defined as the degree to which a system user experience system is capable to manipulate, deal, and execute procurement transactions from placing an order until it reaches the supplier (Brandon-Jones and Carey, 2011). The conceptualisation of processing measure used eight items adapted and modified from Brandon-Jones (2006). Processing dimension reflects the availability of authorisation and security of the processes, in addition to the capabilities which are offered by the system like dealing with complex orders, matching between requested and received order items, tracing order processing, and execution by suppliers.

To operationalise and measure processing, this study adopts the construct measures from Brandon-Jones (2006). The final eight items were developed to evaluate procurement division availability, attention and responsiveness, knowledge, flexibility and effective problem solutions, confidentiality, and friendliness from the perspective of system users as displayed in Table 4.11.

Table 4.11: Items Used for Measuring Processing

#	Items
1	The e-procurement system has an efficient authorization process.
2	The e-procurement system is capable of processing complex orders.
3	The e-procurement system reduces the lead-time of orders.
4	The e-procurement system is secure in processing procuring transactions.
5	The e-procurement system is capable to ensure that the right goods or services are delivered.
6	The e-procurement system is capable to ensure that orders arrive on time.
7	The e-procurement system is capable to ensure that orders are processed quickly.
8	The e-procurement system is capable to ensure that orders get to suppliers quickly.

Source: Brandon-Jones (2006)

Processing construct was reviewed, and validated by a panel of experts (see section 4.2.2). The construct was also subjected to an internal reliability analysis based on a pilot test (see section 4.2.3). The reliability represented by Cronbach's Alpha of this construct was reported to be 0.765 (see Table 4.26), which indicates acceptable internal reliability(Cavana et al., 2001).

Based on the decision rules in Table 4.1, the analysis of processing measures based on the decision rules are displayed in Table 4.12. In line with the previous research by Brandon-Jones (2006), this study will consider processing the construct as a first-order reflective construct.

Table 4.12: Decision Rules to Identify Processing Construct as Formative or Reflective

Criteria	Construct Analysis	Decision: Formative	Decision: Reflective
Rule1: Direction of causality from construct to measure implied by the conceptual definition	Processing construct measures are considered manifestations of the construct, thus changes in the items will not cause change in the construct.		√
Rule2: Interchangeability of the indicators/items	All measurement items are interchangeable, all the items have the same content that reflect the capability of the system to process orders transactions, moreover, dropping one of the measures will not affect the construct.		√
Rule3: Covariation among the indicators	System capabilities covary with each other.		√
Rule4: Nomological net of the construct indicators	All the indicators would have the same antecedents and consequences as all of them reflect the similar content.		√
Final Decision	**Processing is a first order reflective construct**		√

C. Training

Training refers to the degree to which the system users experience adequate, specific timely training in addition to the degree the training influences users work (Mandal and Gunasekaran, 2002). In other words, it can be seen as the extent to which the e-procurement system department prepares the system users to use the system.

This study adopts six training construct measurements from two previous studies. Three items were adopted from Brandon-Jones (2006) who conceptualised training in terms of continual and timely training, usefulness, and appropriateness of training sessions. The inclusion of items that reflect the impact of training on user work was recommended by a panel of experts; the researcher chose three items adopted from Amoako-Gyampah and Salam (2004) study, who conceptualised the training construct in the way the user can evaluate the improvement of his/her skills to using the system through the adequacy of training sessions. However, evaluating training sessions as well as evaluating the impact of training on user's skills and knowledge will give a holistic view of the nature and the quality of training as presented in Table 4.13.

Table 4.13: Items Used for Measuring Training

#	Items
1	The procurement division provides me with timely training to use the system.
2	The procurement division provides useful information about the system during the training.
3	The procurement division provides me with appropriate and specific training to use the system.
4	My level of understanding was improved after going through the training program.
5	The training gave me confidence in using e-procurement system.
6	The training was very detailed and at adequate length.

Source: Items (1-3) Brandon-Jones (2006), Items (4-6) Amoako-Gyampah and Salam (2004)

Training construct was reviewed, and validated by a panel of experts (see section 4.2.2). The construct was also subjected to an internal reliability analysis based on the pilot test (see section 4.2.3). The reliability represented by Cronbach's Alpha of this construct was reported to be 0.886 (see Table 4.26), which indicates acceptable internal reliability (Cavana et al., 2001).

Based on the decision rules in Table 4.1, the analysis of training measures based on the decision rules are displayed in Table 4.14. In line with previous studies by Brandon-Jones (2006) and Amoako-Gyampah and Salam (2004), this study will consider the training dimension as a first-order reflective construct.

Table 4.14: Decision Rules to Identify Training Construct as Formative or Reflective

Criteria	Construct Analysis	Decision: Formative	Decision: Reflective
Rule1: Direction of causality from construct to measure implied by the conceptual definition	Training construct measures are considered manifestations of the construct, thus changes in the items will not cause change in the construct, and any change in the construct will cause changes in the items.		√
Rule2: Interchangeability of the indicators/items	All measurement items are interchangeable, all the items have the same content that reflect training content and environment, moreover, dropping one of the measures will not affect the construct.		√
Rule3: Covariation among the indicators	Training items are covary with each other, e.g., any increase in the quality of training will cause improve the understanding and confidence of using the system.		√
Rule4: Nomological net of the construct indicators	All the indicators would have the same antecedents and consequences as all of them reflect the similar content.		√
Final Decision	**Training is a first order reflective construct**		√

D. Usability

Usability refers to the degree to which the system user experiences, and perceives ease of use, interaction flexibility and navigation around an e-procurement system (Brandon-Jones and Carey, 2011). The current study adopts usability measurement from previous studies by Brandon-Jones (2006) and Davis (1989). Both studies operationalise usability construct in terms of easiness of interaction with the system and moving from screen to another in addition to the availability of the system all the time. Table 4.15 contains seven items that will be used in this study to measure usability dimension.

Table 4.15: Items Used for Measuring Usability

#	Items
1	My interaction with e-procurement system is clear and understandable.
2	It was easy for me to become skillful at using the e-procurement system.
3	The e-procurement system moves smoothly from one screen to the next.
4	The e-procurement system allows easy navigation through the process.
5	The e-procurement system is available at all times.
6	The e-procurement system is easy to use.
7	The e-procurement system is flexible to interact with.

Source: Items (1,2,6,7) Davis (1989), Items (3-5) Brandon-Jones (2006)

Usability construct was reviewed, and validated by a panel of experts (see section 4.2.2). The construct was also subjected to an internal reliability analysis based on a pilot test (see section 4.2.3). The reliability represented by Cronbach's Alpha of this construct was reported to be 0.807 (see Table 4.26), which indicates acceptable internal reliability(Cavana et al., 2001).

Based on the decision rules in Table 4.1, the analysis of usability measures based on the decision rules are displayed in Table 4.16. In line with previous studies by Brandon-Jones (2006) and Davis (1989), this study will consider usability dimension as a first-order reflective construct.

Table 4.16: Decision Rules to Identify Usability Construct as Formative or Reflective

Criteria	Construct Analysis	Decision: Formative	Decision: Reflective
Rule1: Direction of causality from construct to measure implied by the conceptual definition	Usability construct measures are considered manifestations of the construct, thus changes in the items will not cause change in the construct, and any change in the construct will cause changes in the items.		√
Rule2: Interchangeability of the indicators/items	All measurement items are interchangeable, all the items have the same content that reflect user interaction with the system; thus, dropping any of the measures will not affect the construct.		√
Rule3: Covariation among the indicators	Usability dimension items are covary with each other, e.g., when the user perceive the flexibility and ease of use of the system he/she will enjoy the interaction with the system.		√
Rule4: Nomological net of the construct indicators	All the indicators would have the same antecedents and consequences as all of them reflect the similar content.		√
Final Decision	**Usability is a first order reflective construct**		√

E. Content

Content refers to the degree to which a system user experiences the availability and the accuracy of the needed information in the system and the level of effort required to get it (Brandon-Jones and Carey, 2011; Voss, 2003). This study adopts three items from the research of Brandon-Jones (2006), who operationalised the construct in terms of number of suppliers and catalogues uploaded to the system as well as the level of efforts needed to search and reach particular suppliers or product items. Additionally, another four items were adopted from the study by Hou (2012), who operationalised content in terms of the accuracy and the sufficiency of the information provided, as well as the availability of the reports that cover the task requirements. The inclusion of this in the study measures the comments received from the panel of experts who recommended the enhancement of the measure. Table 4.17 contains seven items that will be used in this study to measure usability dimension.

Table 4.17: Items Used for Measuring Content

#	Items
1	The e-procurement system has the right number of suppliers registered.
2	The e-procurement system has the right number of catalogues uploaded.
3	The e-procurement system allows easy searching for suppliers or items.
4	The e-procurement system provides the accurate information I need.
5	The e-procurement system provides information content that meets my needs.
6	The e-procurement system provides reports that meet my needs.
7	The e-procurement system provides sufficient information.

Source: Items (1-3) Brandon-Jones (2006), Items (4-7) Hou (2012)

Content construct was reviewed, and validated by a panel of experts (see section 4.2.2). The construct was also subjected to an internal reliability analysis based on a pilot test (see section 4.2.3). The reliability represented by Cronbach's Alpha of this construct was reported to be 0.876 (see Table 4.26), which indicates acceptable internal reliability (Cavana et al., 2001).

Based on the decision rules in Table 4.1, the analysis of content measures based on the decision rules are displayed in Table 4.18. In line with previous studies by Brandon-Jones (2006) and Hou (2012), this study will consider content dimension as a first-order reflective construct.

Table 4.18: Decision Rules to Identify Content Construct as Formative or Reflective

Criteria	Construct Analysis	Decision: Formative	Decision: Reflective
Rule1: Direction of causality from construct to measure implied by the conceptual definition	Content construct measures are considered manifestations of the construct, thus changes in the items will not cause change in the construct, and any change in the construct will cause changes in the items.		√
Rule2: Interchangeability of the indicators/items	All measurement items are interchangeable, all the items have the same content that reflect the accuracy and adequacy of the uploaded information, thus dropping any of the measures will not affect the construct.		√
Rule3: Covariation among the indicators	Content items are covary with each other, e.g., the adequacy and the accuracy of the information will fulfill the user need for that information.		√
Rule4: Nomological net of the construct indicators	All the indicators would have the same antecedents and consequences as all of them reflect the similar content.		√
Final Decision	**Content is a first order reflective construct**		√

4.2.1.4 Perceived Order Fulfilment Quality

Perceived order fulfilment quality refers to the degree to which system user experienced suppliers’ order fulfilment competencies as seen at order receipt (Vaidyanathan and Devaraj, 2008).

To operationalise and measure perceived order fulfilment quality, this study adopts two dimensions of perceived order fulfilment quality from the previous study by Mentzer et al. (2001). The dimensions are order accuracy and order timeliness. The reason behind choosing the accuracy and timeliness dimensions is the belief of their impact on end-user satisfaction (Vaidyanathan and Devaraj, 2008); in addition, those dimensions reflect the performance of the suppliers and can be perceived and evaluated by the direct buyer (Vaidyanathan and Devaraj, 2008). Details of each of the perceived order fulfilment quality dimensions are provided below in Table 4.19.

Table 4.19: Measurement of Perceived Order Fulfilment Quality Constructs

Construct	Definition	Measure	Source
Accuracy	How closely shipments match customers' orders upon arrival	Evaluate if the shipment contains: • wrong items • incorrect quantity • substituted items	Mentzer et al. (2001)
Timeliness	The extent to whether orders arrive at the customer location when promised	• Delivery time of the shipment	Mentzer et al. (2001)

In this study, perceived order fulfilment quality is conceptualised as the second-order formative construct containing two first-order reflective dimensions (accuracy and timeliness), based on the decision rules and construct measures analysis which is displayed in Table 4.20.

Table 4.20: Decision Rules to Identify Perceived Order Fulfilment Quality Construct as Formative or Reflective

Criteria	Construct Analysis	Decision	
		Formative	**Reflective**
Rule1: Direction of causality from construct to measure implied by the conceptual definition	Perceived order fulfilment quality construct dimensions (accuracy and timeliness) are defining the characteristics of the construct, thus changes in the dimensions will cause change in the construct, and the change in the construct will not affect the dimensions.	√	
Rule2: Interchangeability of the indicators/items	The two dimensions are not interchangeable, the dimensions are distinct from each other, they are not representing the same content, e.g., order accuracy is distinct from order timeliness. Dropping any of the dimensions alter the conceptual domain of the construct	√	
Rule3: Covariation among the indicators	The two dimensions are not covary with each other, e.g., the improvement in the accuracy of shipment items will not affect the time the shipment reaches the buyer.	√	
Rule4: Nomological net of the construct indicators	Each dimension would have the different antecedents and consequences as all of them reflect the different content.	√	
Final Decision	Perceived order fulfilment quality **is a second order formative construct**	√	

F. Accuracy

Order accuracy refers to how closely shipments match customers' orders upon arrival (Bienstock et al., 1997; Mentzer et al., 2001; Mentzer et al., 1999; Vaidyanathan and Devaraj, 2008). Order accuracy measures are adopted from the study by Mentzer et al. (2001), who operationalised the measures by assessing order right items and quantity with no substitutions for items. Table 4.21 provides 3 items employed in the operationalisation of Accuracy.

Table 4.21: Items Used for Measuring Accuracy

#	Items
1	By using e-procurement system shipments rarely contain wrong items.
2	By using e-procurement system shipments rarely contain incorrect quantity.
3	By using e-procurement system shipments rarely contain substituted items.

Source: Mentzer et al. (2001)

Order Accuracy dimension was reviewed, and validated by a panel of experts (see section 4.2.2). The construct was also subjected to an internal reliability analysis based on a pilot test (see section 4.2.3). The reliability represented by Cronbach's Alpha of this construct was reported to be 0.863 (see Table 4.26), which indicates acceptable internal reliability (Cavana et al., 2001).

Based on the decision rules in Table 4.1, the analysis of order accuracy measures based on the decision rules are displayed in Table 4.22. In line with previous studies by Mentzer et al. (2001) and Vaidyanathan and Devaraj (2008), this study will consider order accuracy dimension as a first-order reflective construct.

Table 4.22: Decision Rules to Identify Accuracy Construct as Formative or Reflective

Criteria	Construct Analysis	Decision	
		Formative	Reflective
Rule1: Direction of causality from construct to measure implied by the conceptual definition	Accuracy construct measures are considered manifestations of the construct, thus changes in the items will not cause change in the construct, and any change in the construct will cause changes in the items.		√
Rule2: Interchangeability of the indicators/items	All measurement items are interchangeable, all the items have the same content that reflect user perception of the correctness of shipment items		√
Rule3: Covariation among the indicators	Accuracy dimension items are covary with each other, they have the same content.		√
Rule4: Nomological net of the construct indicators	All the indicators would have the same antecedents and consequences as all of them reflect the similar content.		√
Final Decision	**Accuracy is a first order reflective construct**		√

G. Timeliness

Timeliness refers to whether orders arrive at the customers' location when promised (Hult, 1998; Hult et al., 2000; Mentzer et al., 2001; Vaidyanathan and Devaraj, 2008). Timeliness measurements contain three items that have been adopted from the study of Mentzer et al. (2001). Timeliness is operationalised to reflect the perception of the responsiveness of the suppliers, from the placing of the order until it is received. In other words, this construct measures the extent to which the system contributes to the performance of the suppliers in delivering the good or service. Table 4.23 provides three items employed in the operationalisation of Timeliness.

Table 4.23: Items Used for Measuring Timeliness

#	Items
1	After participating in an e-procurement system time between placing requisition and receiving delivery is short.
2	After participating in an e-procurement system deliveries arrive on the date promised.
3	After participating in an e-procurement system the amount of time a requisition is on back-order is short.

Source: Mentzer et al. (2001)

Timeliness dimension was reviewed, and validated by a panel of experts (see section 4.2.2). The construct was also subjected to an internal reliability analysis based on a pilot test (see section 4.2.3). The reliability represented by Cronbach's Alpha of this construct was reported to be 0.865 (see Table 4.26), which indicates acceptable internal reliability (Cavana et al., 2001).

Based on the decision rules in Table 4.1, the analysis of timeliness measures based on the decision rules are displayed in Table 4.24. In line with previous studies by Mentzer et al. (2001) and Vaidyanathan and Devaraj (2008), this study will consider timeliness dimension as a first-order reflective construct.

Table 4.24: Decision Rules to Identify Timeliness Construct as Formative or Reflective

Criteria	Construct Analysis	Decision: Formative	Decision: Reflective
Rule1: Direction of causality from construct to measure implied by the conceptual definition	Timeliness construct measures are considered manifestations of the construct, thus changes in the items will not cause change in the construct, and any change in the construct will cause changes in the items.		√
Rule2: Interchangeability of the indicators/items	All measurement items are interchangeable, all the items have the same content that reflect shipment delivery time.		√
Rule3: Covariation among the indicators	Timeliness dimension items are covary with each other, they have the same content.		√
Rule4: Nomological net of the construct indicators	All the indicators would have the same antecedents and consequences as all of them reflect the similar content.		√
Final Decision	**Timeliness is a first order reflective construct**		√

After developing the study measure, Table 4.25 summarises the model constructs type hypothesis.

Table 4.25: Summary of Model Constructs Hypothesis

Construct	Type of construct
End-user Satisfaction	First-Order Reflective
Trust	First-Order Reflective
Perceived E-procurement Quality	***Second-Order Formative***
Professionalism	First-Order Reflective
Processing	First-Order Reflective
Training	First-Order Reflective
Content	First-Order Reflective
Perceived Order fulfilment Quality	***Second-Order Formative***
Accuracy	First-Order Reflective
Timeliness	First-Order Reflective

4.2.2 Pre-testing the Measures

To avoid any mistake or error before distributing survey questionnaire it is essential to perform pre-testing on the used instrument (Babbie, 2007). Reviewing research instrument by some experts of the field may improve the instrument or reduce the probable errors and mistakes (Babbie, 2007). All data instruments have limitations and strengths. Since this study is using a questionnaire instrument for collecting data, it has some validity and reliability limitations. In order to improve the validity and reliability of this instrument, the questionnaire has to pass through several pre-testing actions. The pre-tests are executed to ensure that the measures used are consistent, and lies under an acceptable level of validity and reliability. In this case, content validity is essential to ensure the correctness of items' categorisation and the appropriateness of wording used to form each question. Furthermore, content validity can be achieved by exploring the appropriate literature and choosing well-validated construct measurements from previous studies, then ensuring the reliability and validity of the measurement by assessing them to academic and field panel of experts.

In order to ensure content validity for this study, construct items which are adopted from previous literature were tested for content validity by having it reviewed and evaluated by a panel of academics, field experts, Ph.D students, and finally by e-procurement system users (respondents).

4.2.2.1 Evaluation by Panel of Academic Experts

A panel containing fifteen senior academic experts from related Information systems and e-procurement system fields was chosen to evaluate content validity of the constructs. The panel was chosen according to their expertise in the study field. A cover letter which contains instructions and due dates together with a set of proposed research framework concepts associated with the construct name, construct descriptions, and measurement items, are presented and distributed to the selected panel (15 experts). The panel were asked to provide their evaluations, feedback, and comments on the measurement items. Eventually, they were asked whether the items were suitable to represent the proposed construct. Out of the fifteen academic experts, only five completed the evaluation set, handed it over to the researcher or sent it back by e-mail. Based on such expert panel's evaluations, comments, and feedback, some items were revised and modified by rephrasing or rewording. For example, it was recommended to reword the statement 'The e-procurement system moves quickly from one screen to the next' to be 'The e-procurement system moves smoothly from one screen to the next'. Additionally, it was recommended to reword the statement under Processing Dimension 'The e-procurement system ensures' to 'The e-procurement system is capable to ensure.'

4.2.2.2 Evaluation by Panel of Ph. D. Students

After considering the comments and feedback from the panel of academic experts, the questionnaire was sent by e-mail to seven senior Ph.D. students in the Information System field at University Malaya. The researcher requested from the panel of Ph.D. students to provide their opinion and comments on the format of the questionnaire. In addition, each Ph.D. student was asked to scale questionnaire wordings, clarity of sentence, order/flow of questions, and adequacy of instruction by using a 1-5 scale: (1) poor to (5) excellent. Furthermore, the panel was asked to rate the 'level of understanding' from (1) "Difficult to comprehend" to (5) "Easy to comprehend". Based on their comments, some minor adjustments were made to the wording and the order/flow of some questions. The structure of the questionnaire had also been improved to increase its relevance and pleasant look.

4.2.2.3 Evaluation by E-procurement Field Experts

After considering the comments and feedback from the panel of academic experts and Ph.D. students, additional pre-testing was conducted by three of the e-procurement system field experts who were working in the administration office of ePerolehan Unit in Cyberjaya. One of the experts is the ePerolehan Deputy Project Director, and the other two are ePerolehan Unit Officers. Survey questionnaire was presented to them. The researcher asked them for their comments and feedback on the questionnaire wording, content, and format.

Some comments and recommendations are received from ePerolehan Deputy Director, regarding ‘perceived e-procurement system quality construct’. This construct was first conceptualised by Brandon-Jones (2006) in the following six dimensions: professionalism, processing, training, content, usability, and specification. ePerolehan Deputy Director recommends the researcher to drop the ‘specification’ dimension which is operationalised in Brandon-Jones’ study, as the perception of system functionality like integration ability with other financial systems, the capability to reconcile invoices, and the ability to configure the system. ePerolehan Deputy Director mentions that the questions related to ‘specification’ dimension are difficult to be answered by system non-technical end-users. Therefore, the researcher drops the ‘specification’ dimension from the perceived e-procurement system construct.

Other comments are limited and rather focusing on simplifying some phrases and words, by switching them to a more common and familiar language used by ePerolehan users. For instance, the need to use ‘e-procurement Division’ instead of ‘e-procurement Department’. The questionnaire is consequently revised accordingly.

4.2.2.4 Evaluation by Practitioners

The concerned panel consists of a small subset of the main study practitioners represented by direct e-procurement system users, who participated in a gathering held in Sabah on July, 2012. The aim of this pre-testing is to test the ease of answerability of the constructs from the main practitioner's perspective. This evaluation is performed by distributing the questionnaire to a small subset of the study's population and by asking the participants to give their feedback and comment on the components of the instrument, the wordings, and whether they faced any difficulty in understanding the language as well as the concepts. 50 questionnaire sets were printed and handed to ePerolehan Unit Officers who attended the gathering in Sabah. All the sets were distributed, but only 24 questionnaires were completed and collected from the users. The questionnaire was completely filled by the users without any comment or inquiries.

Subsequently, after the pre-testing process and the associated revision, the questionnaire was ready for pilot test.

4.2.3 Pilot Test

The next phase following pre-testing is the pilot test of the questionnaire. Participants from the same research population are asked to fill a pilot study. A pilot study test is recommended by many scholars as a tool to evaluate the appropriateness of study and instrument design (Cooper& Schindler, 2003; Robson, 2002). Since Pilot test precedes actual data collection, it has several advantages. It eventually recognises the deficiencies of questionnaire design and makes certain that different measures present the acceptable degree of reliability. Furthermore, the pilot test is essential to ensure that the questionnaire contains proper wording, that it is in the right order, and the structure is clear enough to be understood by the involved respondents.

To fulfil the pilot test stage, the researcher arranged with ePerolehan Unit Officer to distribute a pilot test questionnaire to e-procurement system users who were invited by ePerolehan Unit to attend a meeting, held on 18th July, 2012 at the Ministry of Finance, in Putrajaya. The purpose of the meeting program was to discuss and practice some new features that will be launched in the e-procurement system. With the presence of the researcher, and by the assistance of ePerolehan Unit Officers, 120 questionnaires were distributed to system users during the meeting. At the end of the meeting 45 usable questionnaires were returned. The time required to fill up the questionnaire was estimated to be between 15-20 minutes. The data obtained from the pilot study is tested for the completeness of the responses and the internal consistency of the construct. No substantial comments are received by the respondents regarding the length and the time required to fill the questionnaire. No substantial remarks are found concerning the difficulty in answering the questionnaire items or regarding the format and structure of the questionnaire. Consequently, no major change and/or adjustment is performed to any of the items. As a result, the structure and the layout of the questionnaire is not modified and the questionnaire is preserved to the final distribution stage.

Straub (1989) recommends testing the reliability of the data from a pilot study prior to actual data collection. The data from pilot study are inserted into (SPSS) software (version 21). To test the reliability of the constructs, Cronbach’s Alpha is used to indicate the extent to which the proposed items can measure or represent a particular construct. The results show that all the constructs are reliable, as the Cronbach's Alpha is reported to be more than 0.70 (Cavana et al., 2001), as presented in Table 4.26.

Table 4.26: Cronbach's Alpha

Constructs	Items	Cronbach's Alpha
End-user Satisfaction (EUS)	3	0.835
Trust (TRS)	6	0.792
Professionalism (PRF)	9	0.913
Processing (PRS)	8	0.765
Training (TRN)	6	0.886
Content (CNT)	7	0.876
Usability (USB)	7	0.807
Accuracy (ACC)	3	0.863
Timeliness (TNL)	3	0.865

4.3 PHASE II: SURVEY

This section provides details on the e-procurement system and research sample determination. In addition, it discusses the administration of the survey instrument by presenting the instrument presentation and questionnaire distribution. Followed by presenting the 'Exploratory Factor Analysis' and the selection of the data analysis, the technique is discussed. Data analysis and hypothesis testing will be presented in details in Chapter 5.

4.3.1 Research Sample Determination

Two points need to be examined when constructing a survey sample; the prospective population and the sample size. The prospective population represents a whole group of people or organisations etc. that researchers want to examine, whilst a subset of the population is referred to as a sample (Saunders et al., 2009). It is difficult to gather data from the whole population with regards to time and expenses along with human resources expenditure (Saunders et al., 2009). A more appropriate technique to conduct this is by choosing an adequate number of elements (a representative sample) from the specific population to investigate. This is done through examining the attributes or even the features of the samples to make generalisations of the attributes or characteristics of the population (Forza, 2002).

4.3.1.1 Target Population

The target population of this study was the end-users of e-procurement system ePerolehan, who were working at the purchasing departments in Malaysian governmental ministries, agencies, and departments. Furthermore, there are several reasons for choosing ePerolehan system users. Firstly, ePerolehan is a mature system launched in 2002 by the Malaysian government to facilitate the procuring process in governmental ministries, departments, and agencies. Secondly, this research evaluates the e-procurement system end-user satisfaction from the perspective of end-users, and ePerolehan is one of the largest procurement systems in Malaysia. Thirdly, Government ministries, agencies, and departments have deployed ePerolehan for a long time, thus the system had encountered continuous improvements as well as updates.

At the time of this study, there were over 5000 direct end-users of the ePerolehan system according to the ePerolehan unit, Ministry of Finance in Cyberjaya, Malaysia.

4.3.1.2 Unit of Analysis

The participants of this study are all direct users of the e-procurement system 'ePerolehan' who have authorisation access to the system to perform purchasing and procurement transactions for their ministries, agencies, and departments (PTJs). Sekaran and Bougie (2010) pointed out that determining the unit of analysis is crucial to any study. According to Au et al. (2002), an end-user is a non-technical employee who utilises or deals with the e-procurement system directly in contrast to the technical employee who programmed the system. Doll and Torkzadeh (1988) defined an end-system user as a user who worked directly with the system by inserting data into the system, then retrieving the information from the system as reports. Cotterman and Kumar (1989) saw the end-user as a consumer of information. Therefore, the unit of analysis of this study is e-procurement system end-users 'individuals' whom were non-technical.

4.3.2 Administration of the Survey Instrument

On July 2012, a meeting was held with ePerolehan Project Director and Deputy Project Director to discuss the research objectives and to obtain permission for data collection from prospective ePerolehan end-users. The researcher assured them of the confidentiality of the individual participant data and the anonymity of the participants. After the discussion, they showed their interest to perform an evaluation on the performance of ePerolehan system by distributing the questionnaire to the system end-users., the ePerolehan Deputy Project Director requested to review the questionnaire in detail before the distribution stage. The researcher spent around two and half hours discussing the questionnaire content with ePerolehan Deputy Project Director. The meeting ended with the recommendation for the rewording of some statements, so as to be made more easily understandable by system users, in addition to suggestions to drop one dimension from system quality construct; that being the ‘specification’ dimension, as she explained that ‘specification’ construct items would be understandable and suitable for technical personnel only, and hence, non-technical end-users would not be able to answer them. ePerolehan Deputy Project Director introduced the researcher to four officers in ePerolehan unit to facilitate the distribution of the questionnaire.

4.3.2.1 Instrument Presentation

Questionnaire As a tool for survey research is subjected to measurement errors. Common methods variance (CMV) is one of the essential measurement errors that researchers should pay attention to when developing the questionnaire. CMV ‘‘is often a problem and researchers need to do whatever they can to control for it’’ (Podsakoff et al., 2003, p. 900). CMV is a “systematic error variance shared among variables measured with and introduced as a function of the same method and/or source” (Richardson et al., 2009, p. 2). CMV is an issue because it causes either inflate or attenuate relationships (Williams and Brown, 1994). To prevent CMV, Spector (2006) recommends that the questionnaire in survey studies should be short; in addition, he recommends the separation between dependent and independent variables.

This study pays attention to CMV issues associated with the utilisation of questionnaire as the source of data collection when developing the survey instrument. To prevent CMV, this study properly and clearly identifies study constructs in line with study context. Moreover, in the development of constructs measurement, the researcher operationalized study constructs according to their precise definition. In addition, items that are already validated and examined in earlier studies are adapted and revised appropriately in this study. Furthermore, to minimise the CMV, the measurements of the study constructs were reviewed by panel of experts in IS field (see section 4.2.2). Following the steps of (Spector, 2006), the researcher divided dependent and independent constructs into different sections and the questionnaire was relatively short, with clear wording; such will be presented in the following sections. The assessment of CMV and measurement equivalents are discussed further in Chapter 5.

Survey administration language was English as the majority of respondents use it in their work and daily life. Wherever possible, questionnaire content was properly selected from previous literature and validated as discussed in the previous sections. All measurement items were presented and assessed at individual level e-procurement system end- users. Adopted items from prior studies were changed to maintain consistency with the assessment level of this research. Language and wordings were revised to be certain that focused participants could effortlessly recognise these questions.

A structured questionnaire was used as a main tool to collect data from prospective participants. The questionnaire contained a cover letter, which introduced the research title, the purpose of the study, researcher and the institution information (see Appendix A-1). The questionnaire consisted of five sections. Section A covered perceived e-procurement system quality (EPQ), professionalism (PRF), processing (PRS), training (TRN), content (CNT), usability (USB). Section B covers order fulfilment quality (OFQ), accuracy (ACC), and timeliness (TLN). Section C covers trust (TRS). Section D covers end-user satisfaction (EUS) (see Appendix A-2). The items stated in sections A, B, C, and D are measured as subjective estimates using a seven point Likert scale; 1 indicates ‘strongly disagree’ and 7 indicates ‘strongly agree’.

Following the questionnaire sections, section E included some demographic questions that were asked to the respondents, such as gender, education, age, and e-procurement system work experience. These questions were presented to verify the characteristics of the respondents. Demographic questions section is presented in multiple choice questions.

The researcher developed and included clear instructions before each section in the questionnaire of how to rate the questionnaire items. The instructions were provided in all the sections to improve respondents’ understanding of how to answer each section without any trouble and as effortless as possible. An example of this is shown on Figure

On the scale **(1 to 7)** where 7 represents **"strongly agree"** and 1 represents **"strongly disagree"** how would you rate each of the following statements? (Kindly circle only one number for each item).

SECTION A: PERCEIVED E-PROCUREMENT QUALITY

#	*Questions*	Strongly Disagree	Somewhat Disagree	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
	➢ ***The procurement division***							
1	... is always available to deal with my queries or problems.	1	2	3	4	5	6	7

Figure 4.3: Questionnaire Section

In addition, the design of the questionnaire was improved based on the comments from a panel of experts and field respondents in the pre-testing stage (see section 4.2.2), for example: big clear font, high quality printing, only four pages, and less packed sentences (see Appendix A-1 and A-2).

4.3.2.2 Questionnaire Distribution

The researcher discussed with ePerolehan unit officers the suitable way to collect the data from e-procurement system end-users. The officers suggested to distribute the questionnaire during the ePerolehan unit gathering of system users, scheduled to be held several times in the following months in the form of system training sessions. The reasons for choosing this method are; firstly, the difficulty to individually visit the ministries, departments, and agencies. Secondly, each gathering and training session includes several users from different ministries, departments, and agencies. Thirdly, the participants of the chosen scheduled gatherings are ePerolehan direct system users; thus, they are representing the study population. Fourthly, this method saves time and effort, and will increase the possibility of the response rate. The fifth reason, is that some gatherings will be held outside Kuala Lumpur and Selangor, so the possibility to have responses from outside Klang Valley will enhance study results.

The schedule of e-procurement system unit gatherings with the end-users during the period of July–December 2012 was given to the researcher. In that period the questionnaires were distributed for three purposes; pre-testing, pilot testing, and final survey. For the purpose of pre-testing 50 questionnaires were distributed to the ePerolehan system users in the meeting which was held in Sabah on 10th, July 2012. However, for pilot test purpose 120 questionnaires were distributed on 18th of July at the Ministry of Finance, Putrajaya. Lastly, to fulfill the main study survey, at first one has to decide the minimum sample size required to the study. Saunders et al. (2009) stated that the minimum sample size can be calculated in relation to population size, level of confidence, and margin of errors. In his book, he presented a table that contained different minimal sample sizes required from different sizes of population, given a 95% confidence level for different margins error (Saunders et al., 2009, p. 219). Saunders stated that in most business and management research, researchers are content to estimate the population characteristics at 95% confidence interval within plus or minus 3% to 5% of its true values.

In this thesis, the population size of ePerolehan end-users according to ePerolehan unit is around 5,000 users, based on (95%) of confident interval and (5%) margin error, while the minimal sample size required is 357 users. To reach the minimal sample size, the researcher decided to distribute initially 1,000 questionnaires to the prospective respondent, taking into consideration the non-response rate. According to Saunders et al. (2009), non-responses will necessitate extra respondents being found to reach the required sample size.

The questionnaires were distributed in the presence of the researcher in two gatherings that were held in Ministry of Finance, Putrajaya, whereas ePerolehan unit officers administrated the distribution of the rest of the questionnaires while not in the presence of the researcher. In this study, sampling was commonly based on random non-probability sampling. In several research situations probability sampling can be extremely difficult or not suitable (Babbie, 2007). In many cases, probability sampling is not an acceptable choice even if it is possible (Babbie, 2007). Under non-probability sampling, the questionnaires are distributed to the respondents without any previous identification.

The distribution of the questionnaires was commenced in October 2012, and concluded by 28th, December 2012. The majority of questionnaires (867) were distributed in the Klang Valley (the area comprising Kuala Lumpur and the State of Selangor) during users' gatherings or meetings 367 questionnaires were collected. 76 collected questionnaires out of the 133 distributed was conducted at the New York Hotel in Johor Bahru on 24th, October 2012. Thus, the total questionnaires collected from scheduled gatherings were 443. 432 questionnaires were considered valid and were inserted in (SPSS) (version 21); thereafter, the researcher tested the collected data for missing data and Monotone Response Pattern.

4.3.3 Data Analysis Technique

To analyze the survey data, suitable techniques and software were chosen. (SPSS) (version 21) was used to prepare the data for analysis and to evaluate multivariate assumption (e.g., normality, linearity) in addition to exploratory factor analysis (EFA). For analysing the data, SmartPLS (version 2.0.M3) was used to assess the confirmatory factor analysis (CFA), reliability, and validity of the measurement, as well as, to test the model hypothesis by assessing structural model.

4.3.3.1 Structural Equation Modeling

Structural Equation Modeling is an advanced statistical analysis method used to understand and analyze complex relationships between variables in various disciplines including social sciences; however, it has been used to evaluate more complex and sophisticated multivariate data analysis methods, while multivariate analysis facilitates statistical investigation that simultaneously analyze multiple variables (Hair Jr et al., 2014). Partial least square structural equation modeling (PLS-SEM) and Covariance-based structural equation modeling CB-SEM are examples of primary exploratory and primary confirmatory statistical methods respectively. Furthermore, these methods include unobservable variables that measured indirectly by utilising indicators to them (Hair Jr et al., 2014), and at the same time, they assist in dealing with measurement errors in observable variables (Chin, 1998).

Structural equation modelling has two second-generation statistical methods: Covariance-Based Structural Equation Modelling (CB-SEM) and Partial Least Square Structural Equation Modelling (PLS-SEM). Table 4.27 exhibits the rules of thumb that could be employed in determining whether to utilise (CB-SEM) or (PLS-SEM). The rules of thumb are outlined with respect to the five forms of decision considerations.

Table 4.27: Rules of Thumb for Selecting CB-SEM or PLS-SEM

Criteria	PLS-SEM	CB-SEM
1) Research Goals	• Predicting key target constructs or identifying key “driver” constructs • Research is exploratory or an extension of an existing structural theory	• Theory testing, theory confirmation, or comparison of alternative theories
2) Measurement Model Specification	• If formative constructs are part of the structural model	• If error terms require additional specification, such as covariation
3) Structural Model	• If the structural model is complex (many constructs and many indicators)	• If the model is non-recursive
4) Data Characteristics and Algorithm	• Sample size is small and/or non-normal data distribution	• Large data sets and/or normal data
5) Model Evaluation	• If you need to use latent variable scores in subsequent analysis	• Requires a global goodness-of-fit criterion • Need to test for measurement model invariance,

(Source: Hair et al., 2011)

After contrasting between the two methods (PLS-SEM and CB-SEM), we decided to utilise the (PLS-SEM) for several reasons: firstly, (PLS-SEM) is a suitable choice when a study concern is to explore or extend an existing structural theory. However, the aim of this study is to extend confirmation theory by introducing the trust construct to it, and examining it in a new context as a mandatory e-procurement system environment. Secondly, (PLS-SEM) is recommended to studies utilising second-order formative constructs, as mentioned in the previous section (4.2.1); perceived e-procurement system quality and perceived order fulfilment quality are two second-order formative-reflective constructs (Chin, 2010). Thirdly, (PLS-SEM) is more desirable for explaining complex relationships as it eliminates two critical issues: inadmissible solutions and factor indeterminacy (Fornell and Bookstein, 1982). Utilising second-order constructs considers complex relationships; however, perceived e-procurement system quality construct is consisting of five dimensions with 37 items.Wold (1985, p. 590) stated later, “in large, complex models with latent constructs, (PLS-SEM) are virtually without competition.” He added also, “PLS comes to the fore in larger models, when the importance shifts from individual variables and parameters to packages of variables and aggregate parameters” (Wold, 1985, p. 589). Fourthly, (PLS-SEM) can deal with small sample sizes as well as big sample sizes, and non-normal data distribution, as mentioned in the following section. The study sample size is adequate and not an issue and the data is normally distributed (see Chapter 5). However, (PLS-SEM) is still applicable in this case. Hair et al. (2011, p. 144) pointed out that “with large data sets, (CB-SEM) and (PLS-SEM) results are similar.” Lastly, latent construct scores will be used to analyze second order constructs, such as perceived e-procurement system quality and perceived order fulfilment quality. Moreover, Marcoulides et al. (2009) highlighted that the Information Systems discipline counts strongly on (PLS-SEM) for assessing path models much more other disciplines.

4.3.3.2 Sample Size

The requested sample size depends on some aspects, such as the suggested data analysis methods (Malhotra, 2007). According to Hair Jr et al., “PLS-SEM has higher levels of statistical power with complex model structures or smaller sample size” (Hair Jr et al., 2014, p. 20). However, (PLS-SEM) accept the use of 10 times rule by Barclay et al. (1995), who recommended the sample size to be of 10 times either the factor that contains the biggest number of formative indicators or 10 times the biggest number of structural paths linked to a specific construct in the structural model (Hair Jr et al., 2014). While this rule indicates the minimum sample size required, the researcher should assign the sample size according to model foundation and data characteristics (Hair et al., 2011). Considering the 10 times rule, the study model has 5 formative indicators that form perceived e-procurement system quality, (5 X 10 = 50 cases), therefore 50 is the minimum required sample size.

Hair and Anderson (2010) stated that bigger sample sizes usually generate higher power for the statistical analysis with respect to the level of Alpha. Furthermore, Pallant (2010) stated that the power of any test is influenced by three factors: sample size, effect size, and Alpha level (e.g., 5% or 1%). Stevens (2009) declared that when the sample size is sufficient, power will not be considered as an issue. On the other hand, Pallant (2010) stated that the sample size should be more than 150 cases with a ratio of five cases for each indicator. Since the proposed model for this study contains 52 indicators (three indicators measure user satisfaction, forty indicators measure perceived e-procurement system quality, six indicators measure perceived order fulfilment quality, three indicators measure trust, following 5:1 ratio (52 x 5 = 260 cases) is the minimum acceptable sample size to this study. In the current study, 432 usable cases are collected from study respondents which is considered sufficient by the power calculations.

SUMMARY

This chapter represented an overview of research design and paradigm. Then, it discussed the research methods that were used for developing and validating research on measures. In addition, this chapter discussed the methods associated with the field study survey for collection of data from the research population.

Next chapter will present in detail, the data preparation and analysis for the collected data by using the (PLS-SEM) technique.

CHAPTER 5

DATA ANALYSIS

INTRODUCTION

This chapter presents the data analysis, and is divided into five sections. Section one discusses data preparation by introducing data coding, cleaning, missing data, monotone response pattern, Demographic analysis, assessment of potential response bias, exploratory factor analysis, outliers and common method bias. Section two discusses the assessment of multivariate assumption by presenting the normality, homoscedasticity, linearity and multicollinearity assessments. Section three provides details on the stages of data analysis by using Partial Least Squares Analysis through SmartPLS (version 2.0.M3), where the constructs reliability and validity were tested. Section four analysis the research model. Section five presents the structural model assessment and analysis the mediation effects of the trust construct. The final section tests the Goodness of Fit of the research model.

5.1 DATA PREPARATION

5.1.1 Data Coding and Cleaning

Data coding is the primary step in data preparation for empirical researches. It facilitates the insertion of the collected data in statistical programs (e.g., SPSS). As presented in (Appendix A-1), the survey questionnaire contains 52 items or questions, which forms the measurement of the proposed constructs of this study. Each item was given a code as a representation for the purpose of data analysis. As pointed out previously, 442 questionnaires (records) were collected from the respondents. Each questionnaire was given a serial number equal to its record number in the (SPSS) program; this step is very important for tracing errors or mistakes. However, the researcher inserts the responses of all respondents in a systematic way by following the items' code that was predefined and entered into the (SPSS) program.

After inserting all of the responses, the data were examined for completeness and consistency via descriptive statistics. Furthermore, the data were checked from extreme mistakes or errors, and missing data by screening the frequency and range for each item. Two cases were found; one of the items has values that exceed the range (1-7 likert scale). This problem was rectified by double-checking it from the original response record (questionnaire). Some record contains missing data, and the next section describes how it is being handled.

5.1.2 Missing Data

Missing data are often an issue in studies that utilizes survey research. Missing data occurs when a respondent intentionally or unintentionally does not respond to one or more questions. When the missing data in one record exceeds 15%, then the record is rendered inapplicable (Hair Jr et al., 2014). After screening our data files, we found that four questionnaires (records) are suffering from more than 15% of missing data, thus those records were removed from the data base file.

The software used in this research is SmartPLS (Ringle et al., 2005); this program offers two options of dealing with missing data; mean value replacement and casewise deletion. In mean value replacement, the missing data is replaced by the mean of the presented indicators under the same construct, while casewise deletion option deletes all the cases or records if it contains missing values. Hair Jr et al. (2014) recommend using the mean value replacement option when there are less than 5% of values missing per indicator. After performing frequency analysis for each indicator, we found that just one indicator under usability has a 3% missing value. Therefore, SmartPLS is configured to use the mean value replacement option. In addition, in SmartPLS, the missing values have to be assigned to a unique number to be identified and recognized by the program. We assigned the value -99 to represent the missing values.

5.1.3 Monotone Response Pattern

Another technique was used to check the data file. However, we screened the pattern for all responses. Straight lining pattern is an issue in survey questionnaires. This happens when a respondent answers all the questions by using the same answer (e.g., in 7th likert scale, the respondent chose 4 for all the answers). In this case the record is considered biased and must be discarded (Hair Jr et al., 2014). When the whole data set was screened for a straight lining pattern, (7) questionnaires were found with this issue, and had to be removed from the data file.

As a result, from 443 collected questionnaires, 4 were excluded due to more than 15% data missing (see section 5.1.2), 7 were excluded due to Monotone Response Pattern, and thus the final number of usable questionnaires was 432 with 43.2% response rate. Table 5.1 summarises the final sample.

Table 5.1: Summary of Final Samples

Population Size	**5000**
Pretest (Sabah) Participants	25
Pilot test (Klang Valley) Participants	45
Initial sample size Distributed	**1000**
Collected (Klang Valley)	367
Collected (Johor Bahru)	76
Total collected	*443*
Missing Data more that 15% (excluded)	(4)
Monotone Response Pattern (excluded)	(7)
Number of Usable Responses	*432*
Response Rate (432/1000)	**43.2%**

5.1.4 Comparison of Construct Means between Klang Valley and Johor Bahru

The study data was collected from two regions Klang valley and Johor Bahru. Thus, it is important to investigate whether there are significant differences about the perceptions of all the constructs in this study among these two regions. An independent-sample t-test is performed to evaluate whether there are significant difference of perceptions on all constructs between the regions. In this study the number of Klang Valley respondents are 367 respondents after excluding 11 responses due to missing data and monotone response pattern, while the Johor Bahru respondents make up to a number of 76 respondents. As presented in Table 5.2, there were no significant differences of the means and standard deviation used between Klang Valley and Johor Bahru respondents for all of the constructs. These results indicated that the respondents from Klang Valley have same perceptions of the constructs to those respondents from Johor Bahru.

Table 5.2: Results of the Independent t-test between Klang Vally and Johor Bahru Respondents

Response		N	Mean	Std. Deviation	t-statistics	Sig. (2-tailed)
Satisfaction (EUS)	Johor	76	5.285	0.899	-0.493	0.622
	Klang	356	5.348	1.038		
Trust (TRS)	Johor	76	5.123	0.734	0.821	0.412
	Klang	356	4.082	11.042		
Professionalism (PRF)	Johor	76	5.096	0.701	0.730	0.466
	Klang	356	4.293	9.582		
Processing (PRS)	Johor	76	5.232	0.745	0.820	0.413
	Klang	356	4.191	11.054		
Training (TRN)	Johor	76	5.086	0.766	0.206	0.837
	Klang	356	4.954	5.597		
Content (CNT)	Johor	76	5.006	0.832	0.175	0.861
	Klang	356	4.893	5.611		
Usability (USB)	Johor	76	5.035	0.771	0.751	0.453
	Klang	356	4.083	11.039		
Accuracy (ACU)	Johor	76	4.439	1.154	-0.233	0.816
	Klang	356	4.590	5.632		
Timeliness (TNL)	Johor	76	4.961	0.802	0.173	0.863
	Klang	356	4.849	5.599		

5.1.5 Demographic Analysis of Respondents

Table 5.3 represents the demographic characteristics of the respondents in the final sample. The details show that (44.7%) of the respondents were male, while (55.3%) were female. The majority of them (85%) holds Certificates, Diploma qualifications, and Bachelor degrees. In addition, (59.3%) of the respondents were in a managerial position while the rest (40.7%) held clerical posts. Referring to the meeting with ePerolehan officer, he said that some purchasing divisions in governmental departments and agencies recruited only one or two personnel to perform purchasing or procurement functions, thus in several cases managerial and clerical duties will be assigned to one person. Moreover, more than (80%) of the respondents reported their tenure with ePerolehan system was more than one year.

Table 5.3: Demographic Summary of Survey Respondents (N=432)

Demographic variables		Frequency	Percent
Gender			
	Male	193	44.7%
	Female	239	55.3%
Education			
	Certificate/ Diploma	196	45.4%
	Graduate (Bachelor Degree)	174	40.3%
	Postgraduate (Master Degree/PHD)	25	5.8%
	Other	37	8.6%
Age			
	20-29 years old	132	30.6%
	30-39 years old	186	43.1%
	40-49 years old	70	16.2%
	50 years old and above	37	8.6%
	Missing Answers	7	1.6%
Job Type			
	Managerial	256	59.3%
	Clerical	176	40.7%
e-procurement use experience	less than 6 months	20	4.6%
	6-12 months	67	15.5%
	1-2 years	133	30.8%
	3-4 years	123	28.5%
	5 years and above	89	20.6%

5.1.6 Assessment of Potential Response Bias

Non-response bias is an essential concern in social science discipline, and happens when actual survey respondents differ from sampled respondents, that may be respondents that refuse to participate in the survey (Malhotra and Grover, 1998). Therefore, in this study, non-response bias was evaluated by contrasting the responses of early and late respondents (Karahanna et al., 1999). To check for response bias, a comparison of means on all study constructs was carried out. The assumption for test is that the late respondents will have similar characteristics as the early respondents. Consequently, the means of the tested constructs for the two groups were set in contrast using a t-test. The t-test for each construct revealed that there were no substantial differences in the make-up of early and late respondents groups. As presented in Table 5.4, there were no significant differences of the means and standard deviation used between early and late respondents for all of the constructs. These results indicated that the users who do not respond to the survey will probably have same perceptions of the constructs to those users who do respond to the survey. The results indicate that non-response bias was low.

Table 5.4: Analysis of Non-response Bias

Response		N	Mean	Std. Deviation	t-statistics	Sig. (2-tailed)
Satisfaction (EUS)	Early	340	5.34	1.00	0.003	0.998
	Late	92	5.34	1.07		
Trust (TRS)	Early	340	4.35	9.81	0.338	0.736
	Late	92	3.95	10.88		
Professionalism (PRF)	Early	340	4.26	9.80	-0.799	0.425
	Late	92	5.08	0.88		
Processing (PRS)	Early	340	4.34	9.80	0.341	0.733
	Late	92	3.93	10.88		
Training (TRN)	Early	340	4.45	9.82	0.297	0.766
	Late	92	4.10	10.90		
Content (CNT)	Early	340	5.23	0.94	1.310	0.194
	Late	92	3.74	10.88		
Usability (USB)	Early	340	4.93	5.72	-0.391	0.696
	Late	92	5.16	0.84		
Accuracy (ACC)	Early	340	4.84	1.24	1.147	0.254
	Late	92	3.54	10.85		
Timeliness (TNL)	Early	340	5.17	0.91	1.229	0.222
	Late	92	3.77	10.87		

5.1.7 Exploratory Factor Analysis

After collecting the study sample, exploratory factor analysis (EFA) was used to confirm the different dimensions underlying the data set; in addition, it measured the constructs' validity (Hair and Anderson, 2010). A total of 52 items that were developed (see section 4.2.1) were subjected to (EFA) using (SPSS) (version 21). Prior to performing the (EFA) test, the suitability of data for factor analysis was assessed. All the items were inserted together without rotation. The inspection of the correlation matrix revealed that the majority of the coefficients were above 0.30. The Kaiser-Meyer-Olkin value was 0.96, exceeded the recommended value of 0.60 (Kaiser, 1970, 1974); in addition, Bartlett's Test of Sphericity achieved statistical significance, supporting the factorability of the correlation matrix (Bartlett, 1954).

Our model construct is divided into four levels as the following; perceived e-procurement system quality for first level; perceived order fulfilment quality for second level; trust for third level, and e-procurement system end-user satisfaction for the fourth level (Gattiker and Goodhue, 2005). We executed (EFA) for each level, utilising the eigenvalue cutoff of 1.0 to identify the number of factors, with the Maximum Likelihood Estimation (MLE) as the extraction method. This method is recommended when the assumption of multivariate normality is met (Hair and Anderson, 2010). In addition, the Oblimin with Kaiser Normalization (oblique) rotation was selected; however, oblique methods allow the factors to correlate and in "social sciences we generally expect some correlation among factors" (Costello and Osborne, 2005, p. 3). Correlation matrix shows that the majority of correlation values were above (0.30). In an exploratory factor analysis, each question should load more strongly on its key factor as compared to its secondary factor. Our guidelines for verifying items using (EFA) were: (1) the item load on the predefined factor, and (2) that the loading on the key factor should be considerably greater than 0.50 of the loading on another factor, and (3) those that cross-loaded above the 0.32 level, or that did not load on any factor above that level, were deleted from the scale (see Appendix B-5). In addition, (Appendix B-4) includes the wording of all items and shows the items that were dropped.

For the first level perceived e-procurement system quality, the initial measurement for perceived e-procurement system quality consisted of five dimensions and 37 items. First, professionalism which predefined to include 9 items; second, processing included 8 items; third, training included 6 items; fourth, usability included 7 items, and fifth, content included 7 items. After running exploratory factor analysis, it was found that 7 factors were extracted as expected, with a total of five items that were dropped due to their low loading (less than 0.50) or cross-loading, one item from training, three items from usability, one item from processing, and two items from content. The rest of the items loaded on their predefined constructs except three items from processing which were loaded on usability. Concerning processing items which loaded on usability, the e-procurement system has an efficient authorisation process. The e-procurement system is capable of processing complex orders, and it reduces the lead-time of orders. We found that these items could count on usability; however, authorisation process improves the usability of the system when the user wants to place an order. In addition, the usability of the system can be perceived when the user finds that it facilitates dealing with complex orders, and when the system reduces the required time to place an order.

For the second level perceived order fulfilment quality, all the items were loaded on two factors as expected (Appendix B-5). 3 items loaded highly on order accuracy (above 0.8) and 3 items highly loaded on order timeliness (above 0.7).

For the third level trust, one factor was extracted, all the six items loaded on the factor as expected (Appendix B-5). The loading range was reported to be 0.646 to 0.891.

For the fourth level e-procurement system end-user satisfaction, The three items loaded greatly on the factor (above 0.80) as expected (Appendix B-5).

5.1.8 Outlier

Outlier is “an observation that is substantially different from the other observations” (Hair and Anderson, 2010). In other words, it can be seen as " an extreme response to a particular question or extreme responses to all questions" (Hair Jr et al., 2013). If a case has a value above or below the majority of other cases, it is regarded as outliers (Pallant, 2010). Outliers can create undesired effect on the correlation coefficient (Pallant, 2010). The decision of removing or retaining the outlier depends on the outlier’s strength and effect on the results. Outliers can be detected using the (SPSS) program. The researcher can detect outliers visually by screening the histogram, normal Q-Q plot, or boxplot for each construct. Moreover, the effect of outlier can be determined by comparing the mean of each construct with the 5% trimmed mean. If the mean values and 5% trimmed mean are very different, further investigation is required for those cases.

However, after inserting all research constructs that are to be tested by using the outlier technique and screening both histogram and boxplot, we found a few outliers in some constructs (see Appendix B-1). Furthermore, in order to assess their effects on the overall distribution, the mean values were contrasted with 5% trimmed mean, and the results in Table 5.5 show that both means values are similar. Given this, and the fact that the values are not too different from the remaining distribution, we will retain these cases in the data file.

Table 5.5: Mean, and 5% Trimmed Mean-outliers

Construct	Mean	5% Trimmed Mean	Std. Deviation	Std. Error
End-user Satisfaction	5.337	5.378	5.337	0.049
Trust	5.230	5.259	5.230	0.043
Professionalism	5.158	5.182	5.158	0.044
Processing	5.215	5.243	5.252	0.042
Training	5.340	5.384	5.360	0.043
Usability	5.218	5.244	5.174	0.042
Content	5.154	5.179	5.128	0.047
Accuracy	4.804	4.841	4.804	0.057
Timeliness	5.110	5.112	5.110	0.044

5.2 ASSESSMENT OF MULTIVARIATE ASSUMPTIONS

5.2.1 Normality Assessment

Normality is one of the crucial assumptions in multivariate analysis. Normality is “degree to which the distribution of the sample data corresponds to a normal distribution”, and it can be seen as “to the shape of the data distribution” (Hair and Anderson, 2010). Normality can be tested in univariate level (single variable) and in multivariate level (combination of two or more variables). If the normality is achieved under multivariate, it implicitly means that it exists under the univariate level, however, the reverse is not true (Hair and Anderson, 2010). The shape of any variable distribution can be represented by two measures: kurtosis refers to the "peakedness" or "flatness" of the distribution and skewness is used to describe the balance of the distribution; if the shape is unbalanced, it will be shifted to either the left or the right side. Statistical programs like (SPSS) calculate the empirical measures of both kurtosis and skewness. The ideal point (symmetrical distribution) is zero (Hair and Anderson, 2010). According to Hair and Anderson (2010), if the empirical z value lies between ±2.58 at (0.01 significance level); or ±1.96, at (0.05 significance level), the distribution of the data is considered normal. On the other hand, the recommended range of skewness and kurtosis values is between ±1 (Hair and Anderson, 2010).

As displayed in Table 5.6, the results show that the values for skewness and kurtosis lies within the range ±1. All the values of skewness are negative, which indicate that the normal distribution shape is skewed to the right. In addition, the kurtosis values for trust, professionalism, usability, content, and timeliness are negative, which indicate that the distribution shape for them is flatter than the end-user satisfaction, processing, training, and accuracy. The Skewness and Kurtosis results are observed in the histograms of all constructs (see Appendix B-1).

Table 5.6: Normality Assessment

Construct	Mean	Std. Deviation	Skewness	Kurtosis
End-user Satisfaction	5.337	1.014	-0.574	0.352
Trust	5.230	0.887	-0.411	-0.093
Professionalism	5.158	0.908	-0.331	-0.302
Processing	5.215	0.869	-0.361	0.095
Training	5.340	0.899	-0.668	0.029
Usability	5.218	0.877	-0.388	-0.079
Content	5.154	0.974	-0.309	-0.249
Accuracy	4.804	1.192	-0.519	0.096
Timeliness	5.110	0.918	-0.050	-0.580

Consistent with normality results in Table 5.6 Q-Q plots (see Appendix B-1) for all constructs show that there is no marked or deviation from a straight line which is consistent with expectation that the data sample has been drawn from a normal population.

5.2.2 Homoscedasticity Assessment

Homoscedasticity highlights the dependence between the variables. In addition, it refers to the assumption that "dependent variable(s) exhibit equal levels of variance across the range of predictor variable(s)" (Hair and Anderson, 2010, p. 73). Moreover, Hair and Anderson (2010) stated that homoscedasticity "is desirable because the variance of the dependent variable being explained in the dependence relationship should not be concentrated in only a limited range of the independent values" (Hair and Anderson, 2010, p. 73). The homoscedasticity was evaluated by screening the scatter plot of all dependent and independent variables (see Appendix B-2). Consequently, the scatter plots showed that homoscedasticity is realized in this study.

5.2.3 Linearity Assessment

Linearity is "used to express the concept that the model possesses the properties of additivity and homogeneity" (Hair and Anderson, 2010). Linearity can be achieved when the relationship between two variables is presented as a straight line instead of a curve.

The violation of the assumption of linearity can be detected by screening the scatter plot. The results shows that the residuals have a directly proportional relationship with the predicted dependent variable scores (see Appendix B-2).

5.2.4 Multicollinearity Assessment

Multicollinearity refers to the relationship between the independent variables (Pallant, 2010). The presence of multicollinearity affects the quality and the results of the regression model (Pallant, 2010) by decreasing the ability to predict the dependent variable and determine the comparable roles of independent variables (Hair and Anderson, 2010). Consequently, the detection of this issue is crucial. The violation of the assumption of multicollinearity can be detected by testing the correlation values among the various variables. The very high correlation (above 0.90) is indicative of the presence of multicollinearity (Pallant, 2010). The correlation matrix for all proposed independent variables for this study is presented in Table 5.7. After checking all correlation values we found that all the values are less than 0.85, indicative of multicollinearity with no serious violations. For more details, correlation matrix for all study dimensions is presented in Appendix B-3.

Table 5.7: Correlations construct level

	OFQ	EPQ	TRS	EUS
OFQ				
EPQ	.653**			
TRS	.657**	.829**		
EUS	.547**	.712**	.697**	

**. Correlation is significant at the 0.01 level (2-tailed).

Legend:

OFQ: Perceived order fulfilment quality
EPQ: Perceived e-procurement system quality
TRS: Trust
EUS: End-user Satisfaction

Another technique that is recommended by some scholars to inspect the degree multicollinearity is by checking Tolerance index (TI) and variance of inflation factor (VIF) values of the regressed variables (Hair and Anderson, 2010; Pallant, 2010). However, if (TI) value is less than (0.10), and (VIF) value more than 10, it indicates that the two variables are highly correlated. Table 5.8 and Table 5.9 summarizes the (TI) and

(VIF) values of all proposed independent variables under construct and dimension level. The findings again confirm that multicollinearity is not an issue in this study.

Table 5.8: Multicollinearity Assessment - Constructs Level

Dependent Constructs	Independent constructs	Collinearity Statistic	
		Tolerance	VIF
End-user Satisfaction (EUS)	Perceived E-procurement Quality	.272	3.673
	Perceived Order Fulfilment Quality	.422	2.372
	Trust	.288	3.469
Trust (TRS)	Perceived E-procurement Quality	.458	2.181
	Perceived order Fulfilment Quality	.458	2.181

Table 5.9: Multicollinearity Assessment – Dimension Level

Dependent Variables	Independent variables	Colinearity Statistic	
		Tolerance	VIF
Perceived E-procurement Quality	Professionalism	0.338	2.957
	Training	0.403	2.483
	Usability	0.293	3.411
	Content	0.381	2.627
	Processing	0.423	2.363
Perceived Order Fulfillment Quality	Accuracy	0.760	1.32
	Timeliness	0.760	1.32

5.3 STRUCTURAL EQUATION MODELING - PARTIAL LEAST SQUARES ANALYSIS PLS-SEM

Structural Equation Modeling (SEM) is an advance statistical analysis method used to understand and analyze complex relationships between constructs in various disciplines, including social sciences. Furthermore, it has been used to evaluate more complex and sophisticated multivariate data, while multivariate analysis facilitates statistical investigation that simultaneously analyze multiple variables (Hair Jr et al., 2014). As discussed in Chapter 4, SmartPLS (version 2.0.M3) is suitable software to analyze and test this research data due to several reasons, the major one is the need to test formative constructs. This research hypothesizes formative constructs, (PLS-SEM) is recommended for studies utilizing the second order formative constructs (Hair et al., 2011).

Table 5.10 summarizes the systematic steps that will be used to evaluate and test research model and hypothesis:

Table 5.10: Systematic Evaluation of PLS-SEM Results

Stage1: Evaluation of the Measurement Model	
Stage 1a: Reflective Measurement Model • Internal Consistency • Convergent Validity • Discriminant Validity	***Stage 1b:*** Formative Measurement Model • Collinearity among indicators • Significance and relevance of Outer weights • Nomological Validity
Stage 2: Analyzing Research Model and Validating Second-Order Constructs	
Stage 3: Evaluation of Structural Model • Significance and the relevance of the structural model path coefficients • Coefficient of determination R^2 • f^2 effect sizes • The predictive relevance Q^2 and q^2 effect sizes	

In stage 1, the measurement model assesses the various measures of reliability and validity (Chin, 2010). Furthermore, in order to estimate measurement parameters, it is important to draw all the relevant links between the constructs and their items (e.g., loadings), in addition to the linear links between various constructs (e.g., path coefficients) concurrently (Chin, 2010).

In this stage, it is crucial to differentiate between various constructs types. The formative and reflective constructs are distinct, and they should not be treated in the same way in measurement model (Henseler et al., 2009). However, reflective constructs are applicable to be assessed for reliability and validity by conducting (CFA) using (PLS-SEM), while the reliability for formative construct is irrelevant, thus, no reliability testing will be conducted for formative constructs except for validity (Henseler et al., 2009). As specified, all the constructs in this study were measured using multiple items. For multi-item constructs, it is important to appropriately categorize them as formative or reflective before assessing measurement properties. However, misspecified measurement models may lead to measurement errors that in turn affect structural model validity (Jarvis, MacKenzie, & Podsakoff, 2003). Referring to Chapter 4, the type of each construct was assigned and discussed in detail under the measurement development section. Table 5.11 summarizes each construct type and hierarchical order, in addition to the number of items remaining after (EFA) test:

Table 5.11: Measurements of Constructs

First-order constructs	***Type***	***# Items***	***Second-order Constructs***	***Type***
End-user Satisfaction	*Reflective*	3		
Trust	*Reflective*	6		
Professionalism	*Reflective*	9	***Perceived E-procurement System Quality***	*Formative*
Processing	*Reflective*	4		
Training	*Reflective*	5		
Usability	*Reflective*	7		
Content	*Reflective*	5		
Accuracy	*Reflective*	3	***Perceived Order Fulfilment Quality***	*Formative*
Timeliness	*Reflective*	3		

Consistent with previous empirical studies, all multi-item first-order constructs in this study are conceptualized as reflective. As discussed in Chapter 4, perceived e-procurement quality is hypothesized as a second-order formative-reflective construct, consisting of five first-order reflective dimensions: professionalism, processing, training, usability, and content. Perceived order fulfilment quality is conceptualized as a second-order formative-reflective construct, with two first-order reflective dimensions; accuracy and timeliness Table 5.7.

In stage 2, the research model will be analyzed and second-order constructs will be validated. Furthermore, the proposed research model will be tested using unidimensional and multidimensional construct, and the results will be compared. Moreover, second-order construct will also be tested by analyzing the unidimensional and multidimensional relationships with other hypothesized constructs. Lastly, the final research model will be presented and confirmed based on this stage's results.

In stage 3, structural model assessment will be conducted on the final research model. Several assessments will be performed to test the research hypothesis by evaluating the significance and the relevance of the structural model path coefficients, testing coefficient of determination R^2, assessing f^2 effect sizes, and evaluating the predictive relevance Q^2 and q^2effect size.

5.3.1 Measurement Model Assessment

5.3.1.1 Reflective Measures Reliability

Reliability refers to the "extent to which a variable or set of variables is consistent in what it is intended to measure" (Hair and Anderson, 2010). In other words, reliability refers to the degree the latent variable reflect its true value with free errors. To further investigate the reliability of reflective constructs, Cronbach's Alpha and composite reliability measures can be extracted by (PLS-SEM). The measurements with Cronbach's Alpha and composite reliability above 0.70 are considered reliable (Hair and Anderson, 2010; Hair Jr et al., 2014; Nunnally, 1978). Compared to Cronbach's Alpha, Composite reliability is regarded as a more rigorous assessment of reliability (Chin, 1998). The reliability level of all reflective constructs is reported in Table 5.12. The results show that all Composite Reliability values are above 0.90, and Cronbach's Alpha ranged from 0.85 to 0.94, consequently, all reflective items realized an acceptable level of reliability.

Table 5.12: Reflective Constructs Reliability

Constructs	Composite Reliability	Cronbach's Alpha
End-user Satisfaction **(EUS)**	0.948	0.918
Trust (TRS)	0.926	0.904
Perceived E-procurement Quality (EPQ)	*Formative*	
Professionalism (PRF)	0.947	0.938
Processing (PRS)	0.921	0.886
Training (TRN)	0.931	0.907
Content (CNT)	0.940	0.921
Usability (USB)	0.938	0.921
Perceived Order Fulfilment Quality (OFQ)	*Formative*	
Accuracy (ACC)	0.964	0.944
Timeliness (TNL)	0.910	0.852

5.3.1.2 Reflective Measures Validity

Validity in general refers the level to which a measure correctly signifies what it is expected to (Hair and Anderson, 2010). "Validity is concerned with how well the concept is defined by the measure(s)" (Hair and Anderson, 2010). There are two types of validity, which are applicable to be executed on reflective measures: convergent validity and discriminant validity. Convergent validity investigates “the degree to which two measures of the same concept are correlated” (Hair and Anderson, 2010), in other words, it refers to the level of correlation between the measures of the same construct (Hair Jr et al., 2014). In contrast, Discriminant validity is “the degree to which two conceptually similar concepts are distinct” (Hair and Anderson, 2010).

A. Convergent validity

Convergent validity can be evaluated by the average variance extracted (AVE) values, which refers to the degree the construct identifies the variance of its indicators. The threshold value of (AVE) must be reported if it exceeds 0.50 (Hair Jr et al., 2014). In addition, confirmatory factor analysis (CFA) is another indicator of convergent validity by using (PLS-SEM). The convergent validity is realized if the indicators or variables of each construct load exceeds 0.70 on their construct more than the other constructs (Hair Jr et al., 2014).

Table 5.13 shows the items loading and the (AVE) values for all reflective constructs. As a result, the loading for all items in reflective construct is reported to have values above 0.70, in addition, (AVE) values exceeds the cutoff point 0.50. Consequently, the convergent validity is achieved among all constructs. For more details, (Appendix B-6) display all the loadings and cross loading for each construct indicators.

Table 5.13: Item loadings and AVE for constructs

Item Loading	Original Sample	Sample Mean	Standard Deviation	Standard Error	T Statistics	AVE
End-user Satisfaction						**0.859**
SAT1	0.913	0.913	0.011	0.011	87.304	
SAT2	0.929	0.929	0.011	0.011	82.083	
SAT3	0.938	0.938	0.008	0.008	116.019	
Trust						**0.678**
TRS1	0.787	0.787	0.020	0.020	39.472	
TRS2	0.860	0.860	0.015	0.015	59.412	
TRS3	0.881	0.880	0.012	0.012	76.320	
TRS4	0.817	0.817	0.022	0.022	36.720	
TRS5	0.831	0.831	0.017	0.017	50.430	
TRS6	0.757	0.757	0.022	0.022	33.965	
Professionalism						**0.667**
PRF1	0.728	0.728	0.027	0.027	27.043	
PRF2	0.808	0.808	0.019	0.019	41.626	
PRF3	0.807	0.807	0.018	0.018	43.807	
PRF4	0.822	0.822	0.018	0.018	45.974	
PRF5	0.859	0.859	0.013	0.013	67.899	
PRF6	0.825	0.825	0.016	0.016	50.573	
PRF7	0.841	0.842	0.015	0.015	55.263	
PRF8	0.843	0.843	0.015	0.015	55.706	
PRF9	0.814	0.815	0.017	0.017	48.797	
Processing						**0.745**
PRS5	0.843	0.842	0.021	0.021	40.653	
PRS6	0.895	0.895	0.012	0.012	77.970	
PRS7	0.868	0.867	0.016	0.016	54.366	
PRS8	0.847	0.847	0.018	0.018	48.058	
Training						**0.729**
TRN2	0.846	0.845	0.017	0.017	49.219	
TRN3	0.876	0.876	0.012	0.012	74.559	
TRN4	0.871	0.871	0.013	0.013	65.455	
TRN5	0.858	0.857	0.014	0.014	63.253	
TRN6	0.817	0.817	0.018	0.018	46.790	
Content						**0.759**
CNT1	0.843	0.843	0.017	0.017	49.832	
CNT2	0.892	0.892	0.012	0.012	74.564	
CNT3	0.858	0.858	0.017	0.017	51.625	
CNT4	0.888	0.888	0.011	0.011	81.559	
CNT5	0.875	0.875	0.013	0.013	66.834	
Usability						**0.717**
USB1	0.853	0.853	0.016	0.016	52.093	
USB2	0.821	0.821	0.016	0.016	51.558	
USB3	0.852	0.852	0.015	0.015	55.165	
USB4	0.810	0.810	0.018	0.018	45.722	
USB6	0.857	0.858	0.013	0.013	64.161	
USB7	0.886	0.886	0.013	0.013	68.584	
Delivery Accuracy						**0.900**
ACC1	0.930	0.930	0.009	0.009	98.908	
ACC2	0.964	0.964	0.005	0.005	200.871	
ACC3	0.952	0.952	0.006	0.006	156.126	
Delivery Timeliness						**0.772**
TLN1	0.871	0.871	0.013	0.013	69.179	
TLN2	0.896	0.896	0.015	0.015	59.699	
TLN3	0.869	0.869	0.015	0.015	56.306	

B. Discriminant validity

Discriminant validity refers to the degree the construct is distinct from the other constructs, which can be evaluated in two ways: the level of correlation between the construct and other constructs, and the degree the measures of the construct represent it and differentiate it from other constructs (Hair and Anderson, 2010). Discriminant validity can be evaluated by comparing the square root of (AVE) values for each construct with the correlation values between the construct and other constructs (Chin, 1998). Shown in Table 5.14, all square roots of (AVEs) are larger than constructs correlations, implying that the variance outlined by the particular construct is greater than the measurement error variance (Fornell and Bookstein, 1982). Subsequently, discriminant validity of the measurement instrument is confirmed.

Table 5.14: Correlation matrix of constructs

	ACC	CNT	PRF	PRS	EUS	TLN	TRN	TRS	USB
ACC	**0.948**								
CNT	0.401	**0.871**							
PRF	0.348	0.645	**0.817**						
PRS	0.455	0.698	0.596	**0.863**					
EUS	0.352	0.580	0.617	0.598	**0.927**				
TLN	0.493	0.640	0.614	0.627	0.633	**0.878**			
TRN	0.325	0.577	0.740	0.601	0.609	0.580	**0.854**		
TRS	0.470	0.690	0.715	0.723	0.698	0.704	0.684	**0.823**	
USB	0.404	0.736	0.746	0.708	0.644	0.662	0.679	0.741	**0.847**

Items on the diagonal are square roots of AVE scores

All correlations are significant at the 0.01 level

Legend:

EUS: End-user Satisfaction, TRS: Trust, ACC: Accuracy, TLN: Timeliness, CNT: Content, PRF: Professionalism, PRS: Processing, TRN: Training, USB: Usability

5.3.1.3 Formative Measures Validity

Formative measures are considered to be error free (Edwards and Bagozzi, 2000; Hair Jr et al., 2014), which indicates the internal reliability as unsuitable (Hair Jr et al., 2014). In addition, evaluating measurement validity by using convergent and discriminant validity in the same manner as reflective measures is meaningless when the formative measures are used (Chin, 1998). Instead, content validity prior to data collection is crucial (Hair Jr et al., 2014). However, the content validity for all measures was confirmed by a panel of expert, as mentioned in Chapter 4.

Hair Jr et al. (2014) proposed three stages to empirically assess formative measurements. First, assessing convergent validity of formative measurement; second, assessing collinearity issues; third, assessing the significance and relevance of formative measures. However, measuring convergent validity for formative measures requires one global reflective measure for the same formative construct to be used as dependent construct for the independent formative construct for the purpose of validity evaluation. Furthermore, the reflective global measure has to be specified in the stage of research design, and collected with other formative indicators. This stage was introduced by Hair Jr et al. (2014) recently in their last book, which was issued in 2013, and our data design and collection was established prior to this citation, thus this stage will not be fulfilled in this study.

A. Formative measures collinearity

In contrast to reflective indicators with interchangeable and correlation nature, formative indicators collinearity is considered a problematic issue from a methodological and interpretational perspective (Hair Jr et al., 2014). The presence of collinearity between formative indicators affects the weights and statistical significance of the indicators (Hair Jr et al., 2014). The level of collinearity can be assessed by tolerance index (TI) and variance inflation factor (VIF). In the context of (PLS-SEM), (TI) value of 0.20 or less, and (VIF) value of 5.0 or higher reflect a potential collinearity issue (Hair et al., 2011). Earlier in (section 5.2.4) Table 5.9 shows that collinearity is not present between perceived e-procurement quality construct and perceived order fulfilment quality, as all (TI) values are above 0.20, and (VIF) values are below 5.0.

B. Significance and relevance of the formative indicators

The last stage of assessing the contribution of formative indicators and their relevance and outer weight is done by performing multiple regressions (Hair and Anderson, 2010). In order to form study second-order formative-reflective construct, the latent variable scores for all first-order constructs will be generated by (PLS-SEM), and will be linked as formative indicators to the second-order construct. However, to picture this, the latent second-order construct will be treated as a dependent construct and the formative indicators (latent scores) as independent constructs. This procedure is recommended by Hair Jr et al. (2014) when first-order constructs have different numbers of items. Furthermore, by comparing the value of outer weights indicators, one can decide the relative contribution of a particular indicator by taking into account its level of significance.

As perceived e-procurement system quality (EPQ) and perceived order fulfilment quality (OFQ) are proposed as second-order formative-reflective constructs, and Table 5.15 concludes that perceived e-procurement system quality indicators such as professionalism, processing, training, content, and usability contribute significantly to their construct perceived e-procurement system quality, as reported all their outer weights are positive and significant. Similarly, perceived order fulfilment quality indicators contribute significantly to their construct. Consequently, both constructs can be represented in a formative way by retaining all their indicators.

Table 5.15: Formative Indicators Outer Weight and Significance

Formative construct	Indicators	Weight	Sample Mean	Standard Deviation	Standard Error	T Statistics
Perceived E-procurement Quality	**Professionalism**	**0.218**	0.216	0.055	0.055	**3.961**
	Processing	**0.308**	0.304	0.046	0.046	**6.657**
	Training	**0.200**	0.201	0.048	0.048	**4.165**
	Content	**0.192**	0.191	0.054	0.054	**3.520**
	Usability	**0.245**	0.247	0.060	0.060	**4.084**
Perceived Order Fulfilment Quality	**Accuracy**	**0.168**	0.169	0.058	0.058	**2.874**
	Timeliness	**0.907**	0.904	0.039	0.039	**23.288**

C. Nomological Validity

A formatively measured construct and its component indicators are inherently dependent on to the nomological network where the construct exists. Consequently, indicator weights will change as the nomological network changes (Cenfetelli and Bassellier, 2009). Diamantopoulos (2006) states that some extent of change in indicator weights ought to be anticipated, as the evaluation of a formatively measured construct depends on the other constructs in the model. In other words, it is important to assess formative measures constructs across different nomological networks. In this study, formative constructs perceived e-procurement system quality (EPQ) and perceived order fulfillment quality (OFQ) are linked separately to both end-user satisfaction (EUS) and trust (TRS) constructs (see Table 5.14 and 5.16). The results shows that indicators' weight change occurs when nomological networks changes, therefore the nomological validity is realized.

5.4 ANALYSIS OF PROPOSED RESEARCH MODEL

This section will test the study research model using (PLS-SEM) by proposing and evaluating alternative models. First, the unidimensionality of the whole model will be tested by treating the entire model constructs as first level constructs. Then, the proposed second-order constructs will be validated by testing the proposed dimensions separately unidimensional with other hypothesized constructs, and comparing with second-order multidimensional construct's results. Finally, based on the comparison of various alternative models, the final research model will be presented.

5.4.1 Test for Overall Model Unidimensionality

All research model constructs are tested in (PLS-SEM) for their unidimensionality relationship with all of the hypothesized constructs Figure 5.1. The results for this test is presented in Table 5.16, and shows that all the unidimensional constructs are significantly related to the end-user satisfaction with the exception of the content and order accuracy. Furthermore, all constructs have a significant relationship with both trust and timeliness. However, only the processing dimension has a significant relationship with accuracy construct.

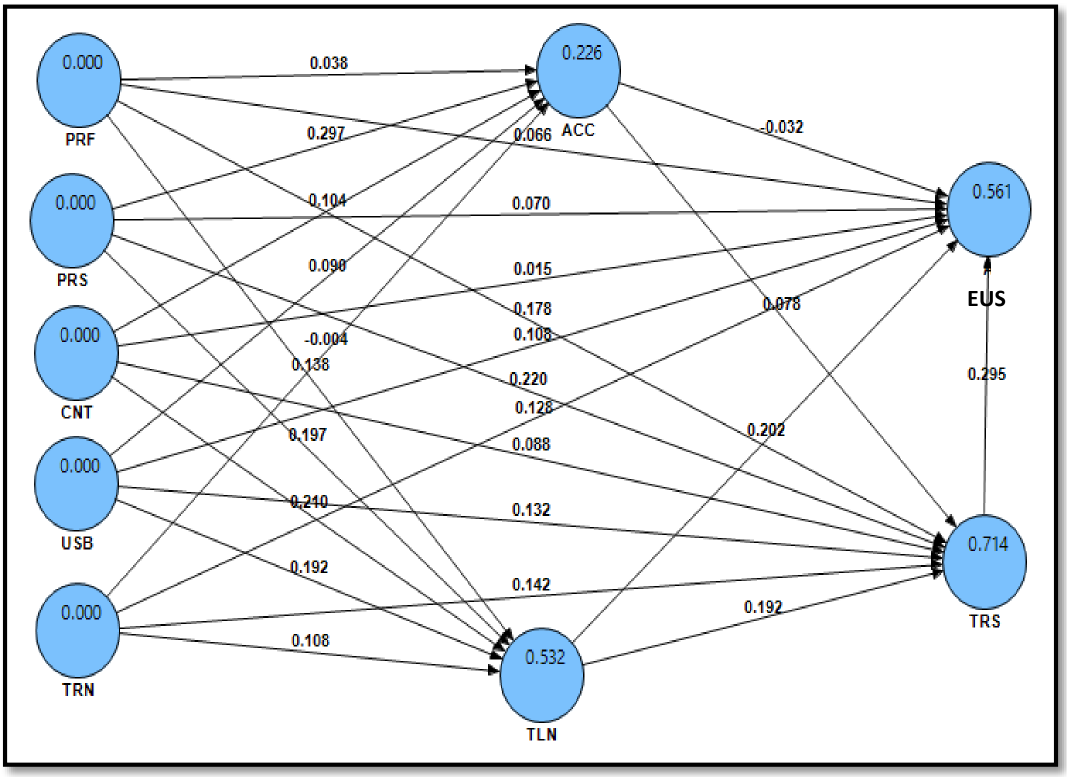


Figure 5.1: Measurement Model between Unidimensional constructs

Legend:
EUS: End-user Satisfaction, TRS: Trust, ACC: Accuracy, TLN: Timeliness, CNT: Content, PRF: Professionalism, PRS: Processing, TRN: Training, USB: Usability

Table 5.16: Research Model Unidimensionality Relationship Results

Dependent Construct	Independent constructs	Path Coefficient	T Statistics	R^2
End-user Satisfaction				**0.561**
	Trust	0.295	4.139	
	Professionalism	0.154	2.248	
	Processing	0.183	2.996	
	Training	0.198	3.561	
	Content	0.095	1.362	
	Usability	0.196	2.379	
	Accuracy	-0.009	0.182	
	Timeliness	0.258	4.613	
Trust				**0.714**
	Professionalism	0.208	4.669	
	Processing	0.281	6.900	
	Training	0.163	3.922	
	Content	0.136	2.970	
	Usability	0.176	3.499	
	Accuracy	0.078	2.449	
	Timeliness	0.192	4.433	
Accuracy				**0.226**
	Professionalism	0.039	0.527	
	Processing	0.298	4.997	
	Training	-0.004	0.057	
	Content	0.104	1.615	
	Usability	0.090	1.185	
Timeliness				**0.532**
	Professionalism	0.138	2.391	
	Processing	0.197	3.983	
	Training	0.108	2.081	
	Content	0.210	3.715	
	Usability	0.192	3.047	

5.4.2 Test for Second-Order Model of Perceived E-Procurement Quality

Perceived e-procurement system quality (EPQ) is hypothesized to be a second-order formative construct with five first-order dimensions. The five first-order dimensions are professionalism, processing, training, usability, and content, and are measured by reflective indicators. Such a measurement model is appropriate for the multidimensional composite construct of perceived e-procurement system quality, because these first-order dimensions signify various aspects of perceived e-procurement system quality. Before evaluating the validity of second-order construct of perceived e-procurement system quality, the measurement properties of first-order constructs have been tested in terms of reliability, convergent, and discriminant validity in the above section. The results indicate that all the first-order constructs have reliable and valid multiple-item measurements.

To validate the second-order formative construct model of perceived e-procurement system quality, alternative models are established for comparison with relative fit. The alternative model proposes the five dimensions; professionalism, processing, training, usability, and content as independent constructs linked directly to the dependent constructs end-user satisfaction, trust, accuracy and timeliness, respectively, as shown in Figure 5.2. These models are established to check the direct effect of all independent constructs on the dependent constructs. The following are the four models.

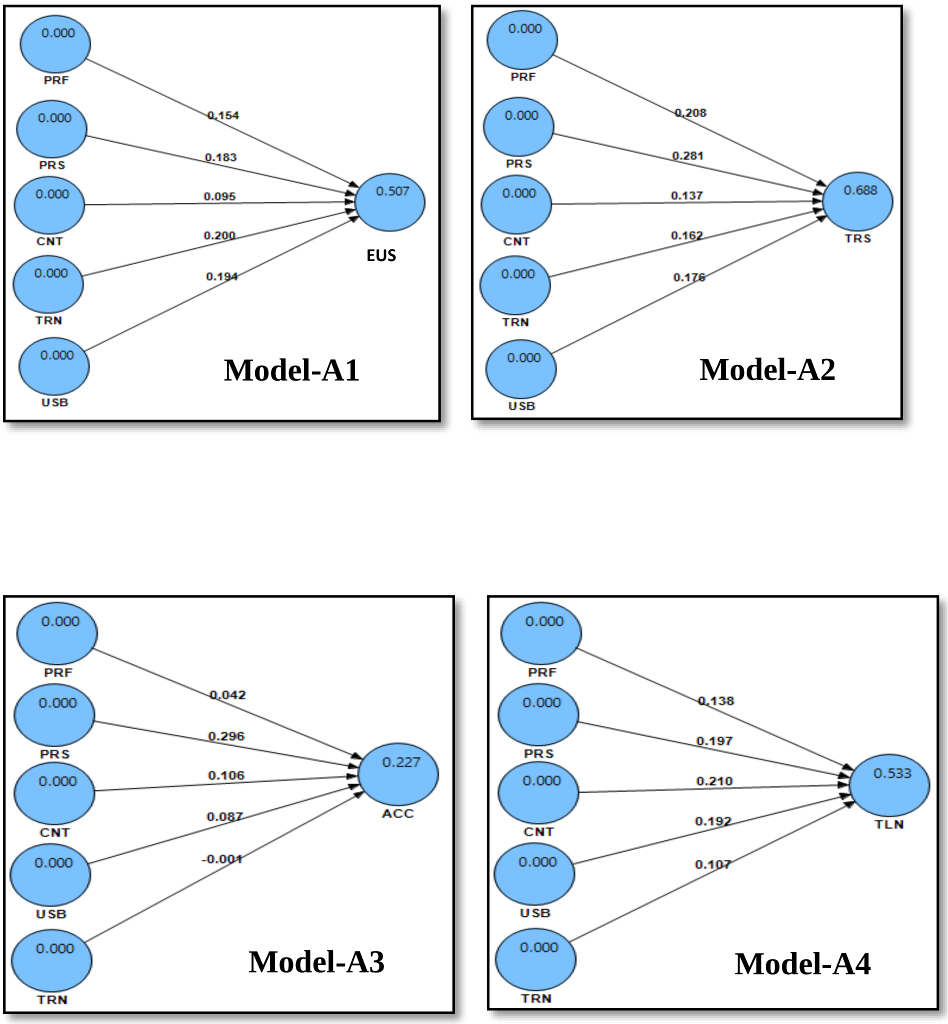


Figure 5.2: Direct connection between first order dimensions of perceived e-procurement quality with dependent constructs.

Legend:
EUS: End-user Satisfaction, TRS: Trust, ACC: Accuracy, TLN: Timeliness, CNT: Content, PRF: Professionalism, PRS: Processing, TRN: Training, USB: Usability

Model-A1, shows the direct linkage of five independent constructs professionalism, processing, training, content and usability directly with end-user satisfaction; the results reveal that end-user satisfaction reported R^2 0.507 with positive, weak, and significant relationships from all constructs, except content construct, which is not significant.

Model-A2, connects five independent constructs professionalism, processing, training, content, and usability directly with trust; the results show that trust reported R^2 0.688 with positive, weak, and significant relationships with all constructs without any exception.

Model-A3 links all independent constructs accurately as dependent construct pointed out that all the relationships are not significant, except processing construct, which reports a significant relationship with accuracy. In this model, the R^2 is reported to be 0.227.

Model-A4 presents the relationship between all independent constructs with timeliness that contributes as dependent construct. All the relationships in this model are positive, weak, and significant, without any exception. It is important to highlight that R^2 on timeliness is reported to be 0.553. Table 5.17 summarizes the results from all of the models.

Table 5.17: First-Order Models

Model	Dependent Construct	Independent constructs	Path Coefficient	T Statistics	R^2
Model-A1	**End-user Satisfaction**				**0.507**
		Professionalism	0.154	2.335	
		Processing	0.183	3.011	
		Training	0.200	3.631	
		Content	0.095	1.438	
		Usability	0.194	2.517	
Model-A2	**Trust**				**0.688**
		Professionalism	0.208	4.269	
		Processing	0.281	6.651	
		Training	0.162	3.963	
		Content	0.137	2.749	
		Usability	0.176	3.313	
Model-A3	**Accuracy**				**0.227**
		Professionalism	0.042	0.589	
		Processing	0.296	4.998	
		Training	-0.001	0.016	
		Content	0.106	1.523	
		Usability	0.087	1.127	
Model-A4	**Timeliness**				**0.553**
		Professionalism	0.138	2.454	
		Processing	0.198	3.873	
		Training	0.107	2.008	
		Content	0.211	3.823	
		Usability	0.192	3.042	

In this study, perceived e-procurement system quality is hypothesized to be second-order formative construct, consisting of five first-order reflective dimensions: professionalism, processing, training, content and usability. We will use the two-stage approach to measure this second-order construct. Two-stage approach is recommended in case the dimensions do not have the same number of indicators. Contrary to the repeat approach, this is recommended when the dimensions have the same number of indicators (Hair Jr et al., 2014). Two-stage approach is implemented by using latent constructs scores, which is calculated by (PLS-SEM) (Hair Jr et al., 2014). The latent constructs scores will be directly connected to the higher order as formative indicators.

Another four models were formed by including second order formative construct called perceived e-procurement system quality. Perceived e-procurement system quality construct is created by linking the five dimensions by their latent constructs scores. Then, the perceived e-procurement system quality construct is connected directly to each dependent construct, as illustrated in Figure 5.3. The four models are described in the following subsections:

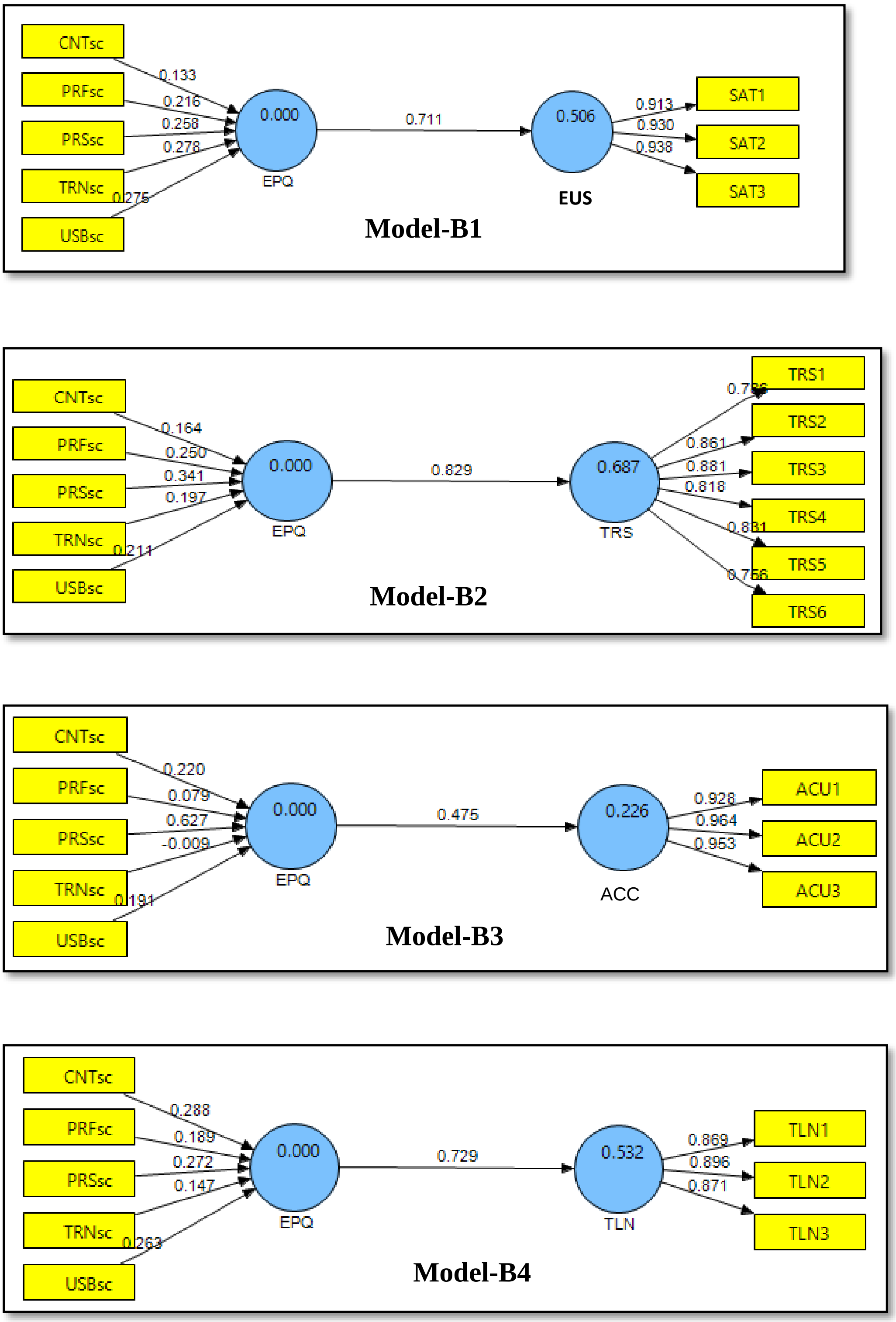


Figure 5.3: Direct connections between perceived e-procurement system quality second-order construct with dependent constructs.

Legend:
EUS: End-user Satisfaction, EPQ: Perceived e-procurement system quality, TRS: Trust, ACC: Accuracy, TLN: Timeliness, CNTsc: Content score, PRFsc: Professionalism score, PRSsc: Processing score, TRNsc: Training score, USBsc: Usability score.

Model-B1 presents the direct connection between perceived e-procurement system quality second order construct with end-user satisfaction, and the result showed high positive and significant path coefficient between the two constructs 0.711. This model reports $\mathbf{R^2}$ value of 0.506, in addition, it shows that all outer weights between the five indicators and their formative construct are significant, except the content dimension, which was not significant.

Model-B2 shows the direct connection between perceived e-procurement system quality second order construct with trust, the results showed high positive and significant path coefficient between the two constructs 0.829. This model reports an R^2 value of 0.687, in addition, it shows that all outer weights between the five indicators and their formative construct are significant, without any exceptions.

Model-B3 is between perceived e-procurement system quality and accuracy, and the results display a positive moderate significant path coefficient 0.475 with an R^2 value of 0.227, moreover, this model shows that not all outer weights of the five dimensions are significant, except the processing dimension, which reported a significant outer weight.

Lastly, ***Model-B4*** demonstrated a direct connection between perceived e-procurement system quality second order construct and timeliness, and the results showed a high positive and significant path coefficient between the two constructs 0.532. This model reports R^2 value of 0.729, in addition, it shows that all outer weights between the five indicators and their formative construct are significant without any exceptions. Table 5.18 summarizes the four models values.

Table 5.18: Second-Order Models

Model	Dependent Construct	Independent constructs	Outer Weight	t Statistics	Path Coefficient	R^2
Model-B1	**End-user Satisfaction**	**EPQ**			0.711*	**0.506**
		Professionalism	0.217	2.336		
		Processing	0.258	3.111		
		Training	0.278	3.711		
		Content	0.133	1.618		
		Usability	0.275	2.642		
Model-B2	**Trust**	**EPQ**			0.829*	**0.687**
		Professionalism	0.250	4.101		
		Processing	0.341	6.874		
		Training	0.197	3.694		
		Content	0.164	2.893		
		Usability	0.211	3.182		
Model-B3	**Accuracy**	**EPQ**			0.475*	**0.227**
		Professionalism	0.079	0.735		
		Processing	0.627	4.847		
		Training	-0.009	0.105		
		Content	0.220	1.717		
		Usability	0.191	1.483		
Model-B4	**Timeliness**	**EPQ**			0.729*	**0.532**
		Professionalism	0.1885	2.3908		
		Processing	0.2716	3.8153		
		Training	0.1472	2.0946		
		Content	0.2878	3.5167		
		Usability	0.2626	2.9487		

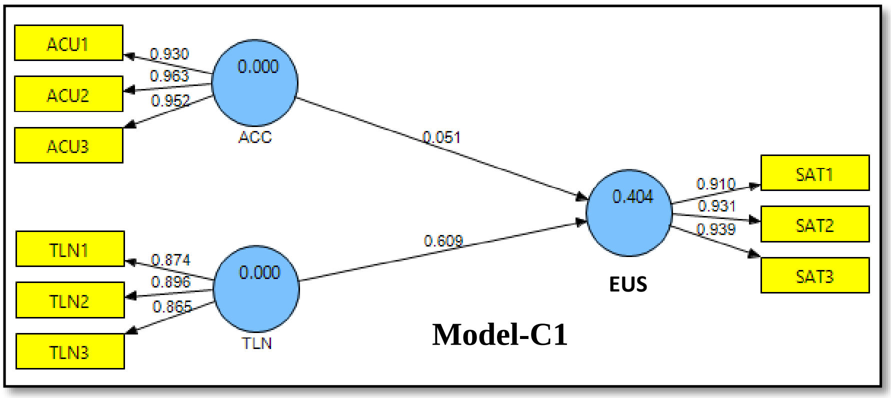
* Significant at the 0.01 level

After comparing two sets of models, model set (A1-A4) deals with five independent constructs, while model set (B1-B4) utilizes the second order perceived e-procurement system quality construct. We find that the path coefficients for all constructs in model set (A1-A4) from Table 5.17 are lower compared to outer weights reported in model set (B1-B4) from Table 5.18. In addition, we realize that the level of significance in both model sets are similar, for example, in model-A1, all independent constructs are reported to be significant except the content construct, this is seen in model-B1 as well, which confirmed that all the formative indicators are significant, except content indicator. Furthermore, all values of R^2 are reported to be similar in both model set, with slight differences that does not exceed 0.001. In conclusion, the similarity between both model sets confirms the validity of using perceived e-procurement system quality as a second-order formative-reflective construct.

5.4.3 Test for Second-Order Model of Perceived Order Fulfilment Quality

Similar to the perceived e-procurement system quality (EPQ) construct, perceived order fulfilment quality (OFQ) is proposed as a second-order formative construct, with two first-order dimensions (Accuracy and Timeliness), and are measured by reflective indicators. Such a measurement model is appropriate for the multidimensional composite construct of perceived order fulfilment quality, because these first-order dimensions form various aspects of perceived e-procurement system quality. Before evaluating the validity of second-order construct of perceived order fulfilment quality, the measurement properties of first-order constructs have been tested in terms of reliability, convergent, and discriminant validity in the above section. The results indicate that all the first-order constructs have reliable and valid multiple-item measurements.

To validate the second-order formative construct model of perceived order fulfilment quality, we will follow the same procedure used in the previous section; however, an alternative model is established to compare the relative fits. The alternative model proposes the two accuracy and timeliness as independent constructs linked directly to the dependent constructs; end-user satisfaction and trust, respectively, as presented in Figure 5.4. These models are established to check the direct effect of all independent constructs on the dependent constructs. Model-C1 and Model-C2 represent this case.



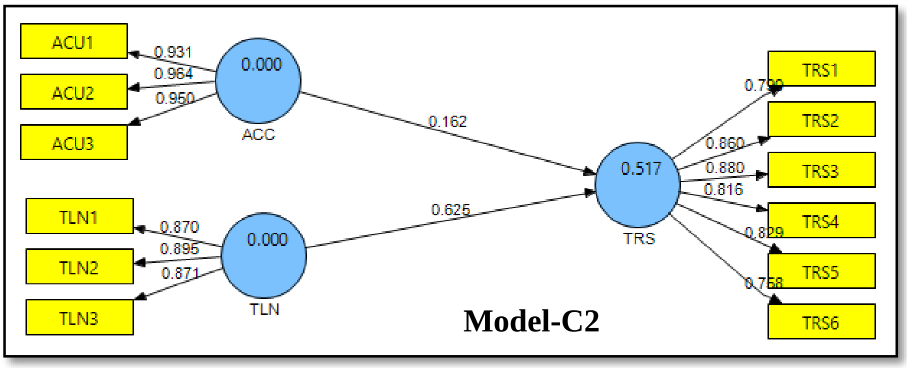


Figure 5.4: Direct connection between first order dimensions of perceived order fulfilment quality with dependent constructs.

Legend:
EUS: End-user Satisfaction, TRS: Trust, ACC: Accuracy, TLN: Timeliness

Model-C1 show the direct link between two independent constructs accuracy and timeliness with the end-user satisfaction; the results reveal that end-user satisfaction reported R^2 value of 0.404, with a positive, strong, and significant relationships from timeliness and positive non-significant relationship with the accuracy construct.

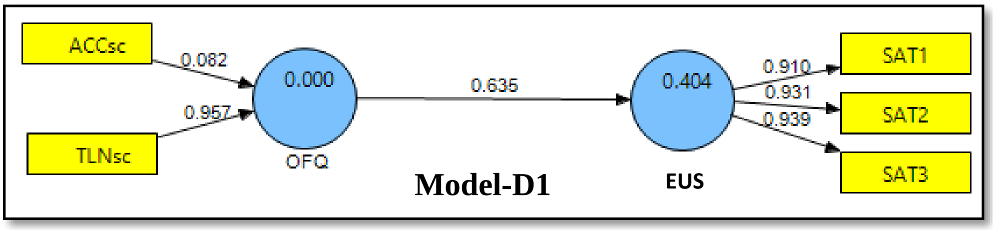
Model-C2 also displays the direct linkage between the independent constructs accuracy and timeliness with trust; however, trust reported an R^2 value of 0.517, with a positive, weak, and significant relationship with accuracy, and positive, strong, and significant relationship with timeliness. Table 5.19 summarizes the results from all of the models.

Table 5.19: First-Order Models

Model	Dependent Construct	Independent constructs	Path Coefficient	t Statistics	R^2
Model-C1	**End-user Satisfaction**				**0.404**
		Accuracy	0.051	0.961	
		Timeliness	0.609	14.793	
Model-C2	**Trust**				**0.517**
		Accuracy	0.162	3.493	
		Timeliness	0.625	16.904	

In this study, perceived order fulfilment quality is hypothesized to be second-order formative-reflective construct, consisting of two first-order reflective dimensions; accuracy and timeliness. Two-stage approach to measure this second-order construct will be used. Two-stage approach is implementing by using latent constructs scores, which is calculated by (PLS-SEM). The latent constructs scores will be directly connected to the higher order as formative indicators.

Another two models were formed by including second order formative-reflective construct called perceived order fulfilment quality. Perceived order fulfilment quality construct is created by linking the two dimensions by their latent constructs scores. Then, the perceived order fulfilment quality construct is connected directly to each dependent construct. The two models are shown in Figure 5.5.



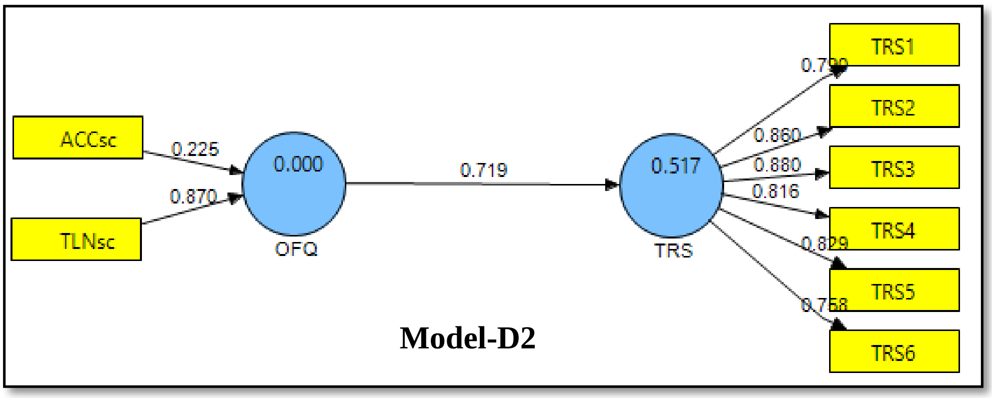


Figure 5.5: Direct connections between second-order perceived order fulfilment quality construct with dependent constructs.

Legend:
EUS: End-user Satisfaction, TRS: Trust, ACCsc: Accuracy score, TLNsc: Timeliness score,

Model-D1 presents the relationship between perceived order fulfilment quality and end-user satisfaction; the results display a positive strong significant path coefficient 0.635 with an R^2 value of 0.404, moreover, this model shows that outer weights of accuracy dimension is small 0.082 and not significant, while on the other hand, timeliness outer weight was reported to be high, positive, and significant.

Next, ***Model-D2*** displays the direct relationship between perceived order fulfilment quality second order construct and trust, and the results showed high positive and significant path coefficients between the two constructs 0.719. Moreover, this model reports an R^2 value of 0.517, additionally, it shows that the outer weights between the two indicators and their formative construct being significant but stronger in timeliness indicator, more than the accuracy. Table 5.20 summarizes the four models' values.

Table 5.20: Second-Order Models

Model	Dependent Construct	Independent constructs	Outer Weight	t Statistics	Path Coefficient	R^2
Model-D1	End-user Satisfaction	**OFQ**			0.635*	**0.404**
		Accuracy	0.082	1.230		
		Timeliness	0.957	20.253		
Model-D2	Trust	**OFQ**			0.719*	**0.517**
		Accuracy	0.225	3.490		
		Timeliness	0.870	19.415		

* Significant at the 0.01 level

After comparing the two sets of models, model set (C1-C2), which deals with two first-order independent constructs, and model set (D1-D2) that utilizes the second order perceived order fulfilment quality construct. We found that the path coefficients for all constructs in model set (C1-C2) are lower by comparing it with the outer weights reported in model set (B1-B4). In addition, we realized that the level of significance in both model sets are similar, for example, in model-C1, the accuracy was reported to not be significant, whereas timeliness is significant, which is the same case as in model-D1, which confirmed that accuracy formative indicators is not significant, but timeliness is. Furthermore, all of the values of R^2 are reported to be similar for both model sets. Consequently, the similarity between both model sets confirms the validity of using perceived order fulfilment quality as a second-order formative-reflective construct.

5.4.4 Research Model

In the previous sections, we have examined the measurement model and provided empirical results that show and prove the reliability and validity of all study constructs. Following that, we validated the use of second-order formative-reflective constructs by providing and comparing the second-order constructs with alternative models. Consequently, Figure 5.6 represents the final research model, which consists of all of the proposed constructs. The following section "Assessing the Structural Model" will provide another empirical data, which will contribute to the testing of the model's hypothesis.

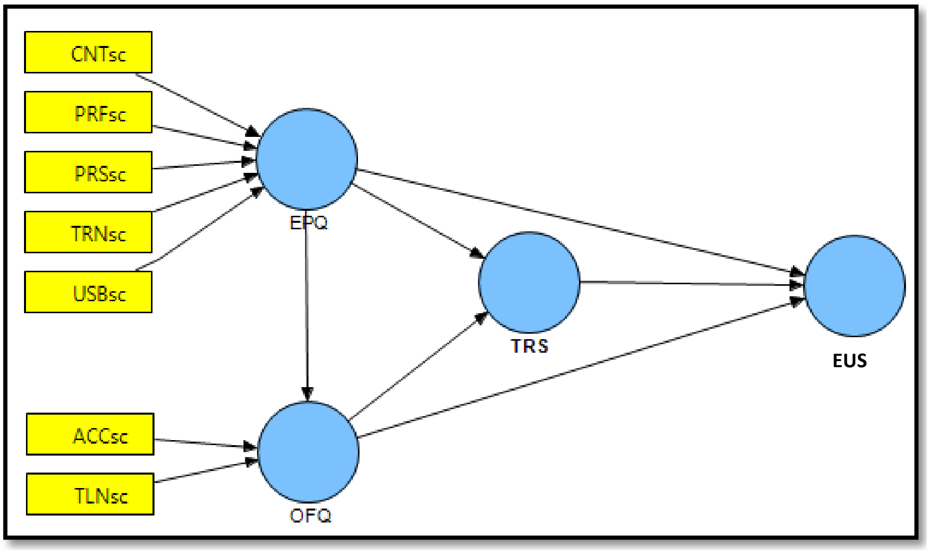


Figure 5.6: Research Model

Legend:
EUS: End-user Satisfaction, EPQ: Perceived e-procurement system quality, TRS: Trust, OFQ: perceived order fulfilment quality, ACCsc: Accuracy score, TLNsc: Timeliness score, CNTsc: Content score, PRFsc: Professionalism score, PRSsc: Processing score, TRNsc: Training score, USBsc: Usability score.

5.5 STRUCTURAL MODEL ASSESSMENT

The main aim of the structural model assessment is to answer the research questions by testing the proposed research hypothesis; obviously, this study has eight research hypotheses; H_1-H_8, which were developed and discussed in detail in Chapter 3 based on the research framework.

After providing the empirical evidences regarding the reliability and validity of the constructs' measurement model, the next step involves evaluating the results from the structural model. However, structural model analysis will show how the empirical data prove and support the underlying theories used in this study (Hair Jr et al., 2013). In addition, it will evaluate the level of predictability the model provides and the relationships among the constructs.

There are four criteria for evaluating structural model in (PLS-SEM): (1) the significance of the path coefficients; (2) the level of R^2 values; (3) the f^2 effect size; (4) the predictive relevance Q^2 , and the q^2 effect size.

5.5.1 Significance and the Relevance of the Structural Model Path Coefficients

The measurement model in the previous sections generates the path coefficients of all the proposed paths in the study model in Figure 5.6. Structural model is an important instrument for assessing the significance level of the path coefficients, since the assessment of structural model using (PLS-SEM) requires the execution of bootstrapping. Table 5.21 contains the configurations and setting used to operate bootstrapping:

Table 5.21: Bootstrapping Settings

	Selected Option	**Reference**
Sign changes	No Sign Changes	(Hair Jr et al., 2013) (Hair et al., 2011)
Cases	432.00	
Samples	5000.00	

After operating bootstrapping, the results of path coefficient, t-values and significance level are presented in Table 5.22. The results conclude that all path coefficients report a significant level, at 0.001. In other words, the results reveal that all study hypotheses are supported.

Table 5.22: Significance Testing Results of The structural Model Path Coefficients

	Path Coefficient	t values	Significance Level	P Values
EPQ --> EUS	0.339	4.545	***	0.000
EPQ --> TRS	0.656	15.366	***	0.000
EPQ --> OFQ	0.736	29.100	***	0.000
OFQ --> EUS	0.175	3.177	***	0.002
OFQ --> TRS	0.235	5.115	***	0.000
TRS --> EUS	0.292	3.947	***	0.000

Level of significance : * p<0.10 **p<0.05 ***p<0.01
Legend:
EUS: End-user Satisfaction, TRS: Trust,
EPQ: Perceived e-procurement system quality, OFQ: Perceived order fulfilment quality.

After evaluating the significance of the relationships between the constructs, it is essential to evaluate the relevance of the significance of the relationships (Hair Jr et al., 2013). Furthermore, in many cases, the path coefficients is significant, while its size is very small to deserve managerial consideration (Hair Jr et al., 2013). Consequently, paying attention to analyze the relevance of the structural model relationships is essential for results' interpretation (Hair Jr et al., 2013).

The results of Table 5.22 showed that the Perceived e-procurement quality (EPQ), perceived order fulfilment quality (OFQ), and trust (TRS) significantly contribute to the end-user satisfaction (EUS), while perceived e-procurement system quality reports the highest contribution (β=0.339, t-value (4.545)>1.96), followed by trust (β=0.292, t-value (3.947)>1.96), then perceived order fulfilment quality (β=0.175, t-value (3.947)>1.96), which has a very little bearing on the end-user satisfaction. The results also revealed that both perceived e-procurement system quality has a direct significant influence (β=0.656, t-value (15.366)>1.96) on trust, whereas perceived order fulfilment quality has a significant but weak (β=0.235, t-value (5.115)>1.96) impact on trust. Finally, perceived e-procurement quality reports a significant and superior strong effect (β=0.736, t-value (29.100)>1.96) on perceived order fulfilment's quality.

5.5.2 Coefficient of Determination R^2

The coefficient of determination R^2 is considered as a measure of model's predictive accuracy, and is calculated as the squared correlation between dependent construct and predicted values (Hair Jr et al., 2013). In addition, it reflects the independent constructs joint effects on the dependent construct (Hair Jr et al., 2013). In other words, it reflects the amount of variance in the dependent construct, which is explained by all the independent constructs that influenced it (Hair Jr et al., 2013). According to Hair et al. (2011), R^2 values of 0.75, 0.50, or 0.25 for dependent constructs are considered strong, moderate, and weak, respectively.

Figure 5.7 presents the measurement model of this study and displays the R^2 values. However, R^2 value for the end-user satisfaction is 0.555, which can be considered strong; it indicates that 55.5% of the variance in the end-user satisfaction is explained by perceived e-procurement quality construct, perceived order fulfilment quality, and trust, whereas the R^2 value for trust, reported to be 0.712, is substantial and means that 71.2% of the variance in trust construct are explained by perceived e-procurement quality construct, perceived order fulfilment quality construct. Finally, 54.2% of perceived order fulfilment quality construct is explained by perceived e-procurement quality construct.

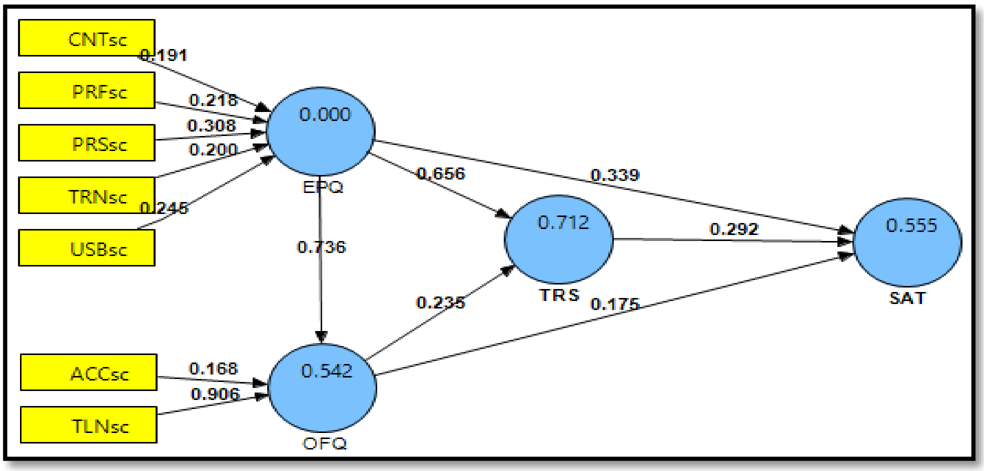


Figure 5.7: Measurement Model

Legend:
EUS: End-user Satisfaction, TRS: Trust, EPQ: perceived e-procurement system quality, OFQ: perceived order fulfilment quality. ACCsc: Accuracy score, TLNsc: Timeliness score, CNTsc: Content score, PRFsc: Professionalism score, PRSsc: Processing score, TRNsc: Training score, USBsc: Usability score

5.5.3 f^2 Effect Sizes

The effect size of f^2 is the assessment of R^2 in a case when a particular independent construct is removed from the model. Thus, it evaluates the impact size of the removed independent construct on the dependent construct (Hair Jr et al., 2013). The effect of the size of f^2 can be calculated as:

$$f^2 = \frac{R^2 included - R^2 excluded}{1 - R^2 included}$$

The value of f^2 can be contrasted to 0.02, 0.15, and 0.35 to report small, medium, and large effects, respectively (Cohen, 1988; Hair et al., 2012). Table 5.23 shows that the effect of the size of all independent constructs on the dependent is small, or less than 0.15, except the effect of perceived e-procurement quality on trust, which showed a large size effect.

Table 5.23: Results of R^2 and f^2 Values

Dependent construct	**Independent construct**	R^2_{included}	R^2_{excluded}	f^2
EUS		**0.555**		
	EPQ		**0.523**	**0.072**
	OFQ		**0.543**	**0.027**
	TRS		**0.530**	**0.056**
TRS		**0.712**		
	EPQ		**0.514**	**0.688**
	OFQ		**0.687**	**0.087**

Legend:
EUS: End-user Satisfaction, TRS: Trust,
EPQ: Perceived e-procurement system quality,
OFQ: Perceived order fulfilment quality

"It is important to understand that a small f^2 does not necessarily imply an unimportant effect. If there is a likelihood of occurrence for the extreme moderating conditions and the resulting beta changes are meaningful, then it is important to take these situations into account" (Limayem et al., 2001, p. 281).

5.5.4 The Predictive Relevance Q^2 and q^2 Effect Sizes

Q^2 value "is a measure of predictive relevance based on the blindfolding technique" (Hair Jr et al., 2013, p. 203). Blindfolding procedure can be regarded as a resampling process that specify and delete data points of the indicators in a systematic way to predict the measurement model of the reflective dependent constructs (Hair Jr et al., 2013). Blindfolding technique depends on the omission distance (D) that "determines which data points are deleted when applying the blindfolding procedure." However, as Q^2 value can be extracted and calculated for reflective dependent constructs only, we used the blindfolding technique on the end-user satisfaction (EUS) and Trust (TRS) constructs by specifying the omission distance of (D=7). According to

Hair Jr et al. (2013), the path will have predictive relevance if Q^2 exceeds zero, and referring to Table 5.24, the values of q^2 is reported to exceed zero.

Table 5.24: Results of Q^2 and q^2 Values

Dependent construct	**Independent construct**	**Q^2 included**	**Q^2 excluded**	**q^2**
EUS		**0.551**		
	EPQ		**0.521**	**0.068**
	OFQ		**0.540**	**0.025**
	TRS		**0.527**	**0.054**
TRS		**0.705**		
	EPQ		**0.513**	**0.653**
	OFQ		**0.683**	**0.076**

Legend:
EUS: End-user Satisfaction, TRS: Trust,
EPQ: Perceived e-procurement system quality,
OFQ: Perceived order fulfilment quality

5.6 TRUST MEDIATION ANALYSIS

The main objective of this section is to empirically test the last two research hypotheses; H_7 and H_8, which are concerned with analyzing the mediation effect of trust between perceived e-procurement system quality, perceived order fulfilment quality, and end-user satisfaction.

In order to explore the different impacts of different independent constructs on the dependent constructs via mediating constructs, total effect is the criteria, which represent the sum of direct and indirect effects. By exploring Table 5.25, we can conclude that among the three independent constructs that influences the end-user satisfaction, perceived e-procurement's quality has the strongest total effect 0.71, followed by trust 0.29, and finally perceived order fulfilment quality 0.24. Furthermore, the results showed that the total effect of perceived e-procurement quality on trust is very strong 0.83 compared to the effect of perceived order fulfilment quality 0.23.

Table 5.25: Significance Testing Results of The Total Effects

	Path Coefficient	t-Values	Significance Level	P Values
EPQ --> EUS	0.709	24.683	***	0.000
EPQ --> TRS	0.829	50.044	***	0.000
EPQ --> OFQ	0.736	28.706	***	0.000
OFQ --> EUS	0.243	4.461	***	0.000
OFQ --> TRS	0.235	5.161	***	0.000
TRS --> EUS	0.292	3.972	***	0.000

Level of significance: * p<0.10 **p<0.05 ***p<0.01
Legend:
EUS: End-user Satisfaction, TRS: Trust,
EPQ: Perceived e-procurement system quality,
OFQ: Perceived order fulfilment quality

In the previous sections, research hypothesis (H_1- H_6) was tested, and the results showed positive and significant relationships between all participated constructs, without exceptions (see Table 5.25).

In this section, we will test the last two hypotheses (H_7 and H_8) that propose a causal relationship between perceived e-procurement quality, perceived order fulfilment quality, and trust and end-user satisfaction. Thus, (H_7) proposes that trust mediates the relationship between the independent constructs perceived e-procurement quality and the dependent construct end-user satisfaction, while (H_8) proposes that trust mediates the relationship between the independent constructs perceived order fulfilment quality and the dependent construct end-user satisfaction. To test the trust-mediating effect, we will follow three steps presented in Table 5.26 and recommended by Hair Jr et al. (2014). In addition, some illustrations will be presented by comparing two alternative models (Model 2 and Model 3) to our baseline model (Model 1) that shows all of the proposed relationships between study constructs, as shown in Figure 5.8.

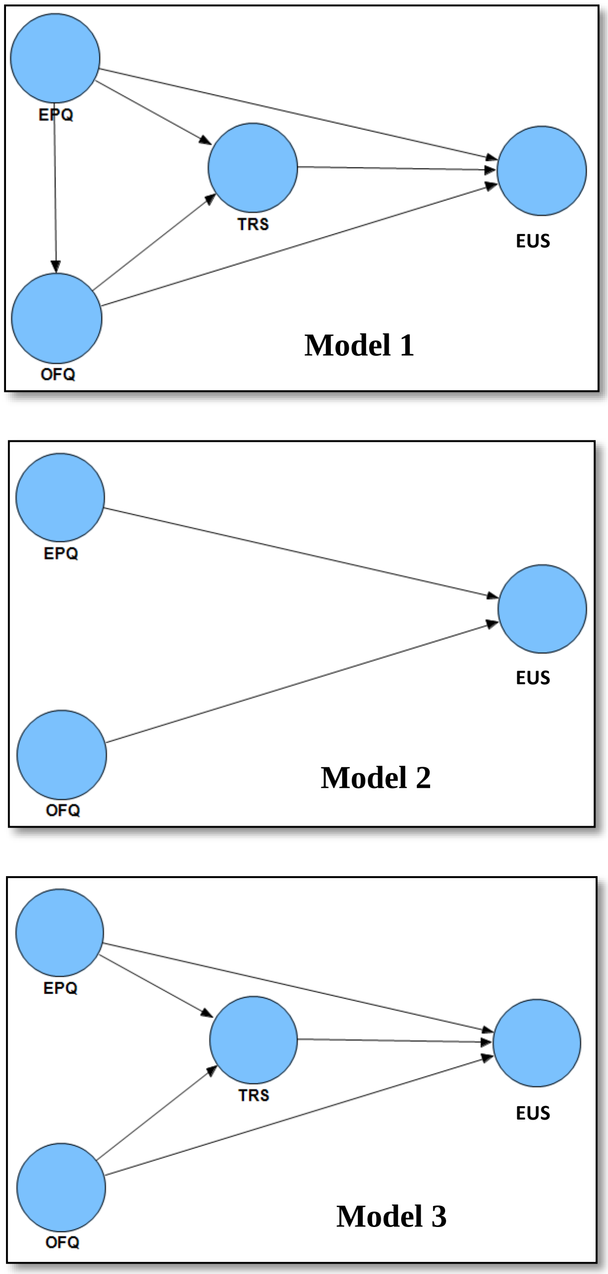


Figure 5.8: Alternative Models for Testing Mediating Effect

Legend:
EUS: End-user Satisfaction, TRS: Trust,
EPQ: Perceived e-procurement system quality,
OFQ: Perceived order fulfilment quality

Following the steps in Table 5.26, hypotheses H_7 and H_8 will go through three steps. **Step one** is concerned with the assessment of the significance of the direct effect between the independent and the dependent construct without including a mediator construct, as illustrated in Model 2. The investigation will be extracted from (PLS-SEM) by conducting bootstrapping procedure with (432 observations per subsample, 5000 subsamples, and no sign changes) as recommended by Hair Jr et al. (2014). Path coefficient and t-value will be provided by (PLS-SEM) bootstrapping procedure. If the direct effect without a mediator is not significant, it is indicative of no mediating effect. On the other hand, if the direct is significant, further assessment will be conducted by the following step (Step two).

Table 5.26: Steps for Testing Mediation Effect

Steps	Result	Interpretation
Step one: Test significance of the direct effect without including the mediator	Not significant	No mediating effect
	Significant	Proceed to step two
Step two: Test significance of the indirect effect with including the mediator	Not significant	No mediating effect
	Significant	Proceed to step three
Step three: Test the strength of the mediation by calculating variance account for (VAF)	VAF > 80%	Full mediation
	20% ≤ VAF ≤ 80%	Partial mediation
	VAF < 20%	No mediation

Step two, after proving the significance of the direct relationship between the constructs, the indirect effect relationship by including the mediator will be assessed (Model 3). Again, the investigation will be extracted from (PLS-SEM) by conducting bootstrapping procedure with (432 observations per subsample, 5000 subsamples, and no sign changes), as recommended by Hair Jr et al. (2014). Path coefficients for the two paths independent construct -> mediator construct (a) and mediator construct -> dependent construct (b) Figure 5.9 will be provided by (PLS-SEM) bootstrapping procedure, but the significance of the indirect effect will be calculated manually by following Sobel's Formula (Sobel, 1982):

$$\boldsymbol{z} = \frac{\boldsymbol{a} \times \boldsymbol{b}}{\sqrt{\boldsymbol{a}^2 \boldsymbol{S}\boldsymbol{b}^2 + \boldsymbol{b}^2 \boldsymbol{S}\boldsymbol{a}^2}}$$

(a) Represents the path coefficient between the independent construct and the mediator, (b) represents the path coefficient between the mediator and the dependent construct, (Sa) represents standard deviation error of path (a), and (Sb) represents standard deviation error of path (b) Figure 5.9.

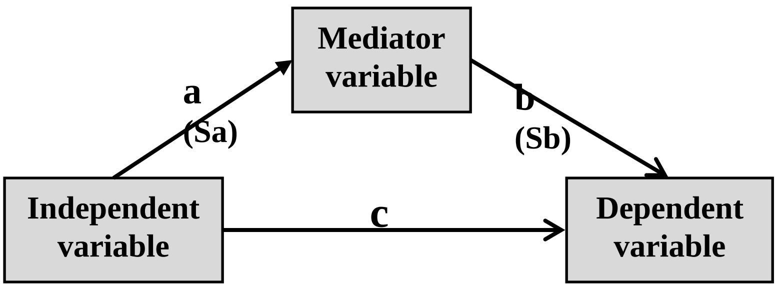


Figure 5.9: Mediation Paths

However, if the indirect effects are reported as not significant, this indicates that no mediating effect occurred. Nevertheless, if it is significant, further assessment will be conducted using the following step (Step three).

Step three, after confirming the significance of the direct effect (Step one) and indirect effect (Step two), testing the strength of the mediating construct is the last step. This kind of assessment can be done using variance accounted for (VAF) (Hair Jr et al., 2014), which can be calculated by dividing indirect effect over total effect :

$$\mathbf{VAF} = \frac{\textbf{Indirect effect}}{\textbf{Total effect}} = \frac{\boldsymbol{a.b}}{\boldsymbol{a.b + c}}$$

(a) Represents the path coefficient between the independent construct and the mediator, (b) represents the path coefficient between the mediator and the dependent construct, while (c) represents the path between the independent construct and the dependent construct, as illustrated in Figure 5.9.

According to Hair Jr et al. (2014), one can interpret (VAF) values in the following way: VAF > 80% indicates full mediation, 20% ≤ VAF ≤ 80% means partial mediation, and VAF < 20% indicates no mediation.

In order to test H_7 and H_8, we conducted (PLS-SEM) bootstrapping procedure by using (PLS-SEM) (432 observations per subsample, 5000 subsamples, and no sign changes). Table 5.27 summarizes the effect values in addition to t-values and p values (calculated by using excel functions) for the two hypotheses paths.

Table 5.27: Mediation Analysis

	(H_7): EPQ->TRS->EUS			**(H_8): OFQ->TRS->EUS**		
	Effect value	**t Value**	**p Value**	**Effect value**	**t Value**	**p Value**
Without mediator						
Direct effect (EPQ->EUS)	**0.528**	**9.959**	**0.000**	**0.246**	**4.203**	**0.000**
With mediator						
Direct effect (EPQ->EUS)	**0.339**	**4.412**	**0.000**	**0.174**	**3.267**	**0.001**
Indirect effect (EPQ->TRS-> EUS)	**0.191**	**3.763**	**0.000**	**0.069**	**3.083**	**0.002**
Total effect (EPQ->TRS-> EUS)	**0.530**	**10.546**	**0.000**	**0.243**	**4.541**	**0.000**
Variance accounted for (VAF)	**36.1%** Partial mediation			**28.2%** Partial mediation		

Legend:
EUS: End-user Satisfaction, TRS: Trust,
EPQ: Perceived e-procurement system quality,
OFQ: Perceived order fulfilment quality

(H_7) tests trust (TRS) mediating effect between perceived e-procurement system quality (EPQ) and end-user satisfaction (EUS). The results showed that the direct effect of the relationship between perceived e-procurement system quality and end-user satisfaction without the presence of trust is positive and significant (β= 0.528, t-value (9.959)>1.96). In addition, the indirect effect is the product of the direct effect between perceived e-procurement system quality and trust, as well as between trust and end-user satisfaction, and the results reveal that the indirect effect of perceived e-procurement system quality, via the trust mediator construct, on end-user satisfaction is significant (β= 0.191, t-value (3.763)>1.96). To test the strength of the mediating effect, variance accounted for (VAF) value was calculated and showed a value of 36.1%, which indicates that about 36.1% of the total effect of perceived e-procurement system quality onto end-user satisfaction is explained by the indirect effect. In other words, trust partially mediated the relationship between perceived e-procurement system quality and end-user satisfaction.

(H_8) tests trust (TRS) mediating effect between perceived order fulfilment quality (OFQ) and end-user satisfaction (EUS). The results showed that the direct effect of the relationship between perceived order fulfilment quality and end-user satisfaction, without the presence of trust, is positive and significant (β= 0.246, t-value (4.203)>1.96). In addition, the indirect effect is the product of the direct effect between perceived order fulfilment quality and trust, as well as between trust and end-user satisfaction, and the results reveal that the indirect effect of perceived order fulfilment quality, via the trust mediator construct on end-user satisfaction is significant (β= 0.069, t-value (3.083)>1.96). To test the strength of the mediating effect, variance accounted for (VAF) value was calculated and showed the value of 28.2%, which indicates that about 28.2% of the total effect of perceived order fulfilment quality onto end-user satisfaction is explained by the indirect effect. Consequently, trust partially mediates the relationship between perceived order fulfilment quality and end-user satisfaction.

5.7 GOODNESS OF FIT (GoF)

Contrary to CB-SEM that has the ability to apply the measures of goodness of fit, (PLS-SEM) is evaluated according to “heuristic criteria”, which is identified by the model’s predictive capabilities (Hair Jr et al., 2013). As reported by Tenenhaus et al. (2005) *“… PLS path modeling does not optimize any global scalar function so that it naturally lacks of an index that can provide the user with a global validation of the model (as it is instead the case with x^2 and related measures in SEM-ML). The GoF represents an operational solution to this problem as it may be meant as an index for validating the PLS model globally*.” (Tenenhaus et al., 2004; Tenenhaus et al., 2005). Evaluating goodness-of-fit (GoF) can be realized by calculating the geometric mean of the average communality and the average R^2 using the following equation:

$$\textbf{GoF} = \sqrt{Average\ \textbf{communality} * \text{Average } R^2}$$

The indices for communality and explained variability R^2 are given in Table 5.28. R^2 may not be computed, of course, for independent constructs (perceived order fulfilment quality, in this case). According to the results in Table 5.24, the GoF index is described in the following form:

$$\text{GoF} = \sqrt{0.738 * 0.603} = 0.667$$

Meaning that the model is able to take into account 66.7% of the achievable fit, and indicative of the fact that the model is satisfactory (Tenenhaus et al., 2005).

Table 5.28: R^2 and Communality

Construct	R^2	Communality
End-user Satisfaction	**0.555**	**0.859**
Trust	**0.712**	**0.678**
Perceived E-procurement Quality	**–**	**0.737**
Perceived Order Fulfilment Quality	**0.542**	**0.678**
Average	**0.603**	**0.738**

Finally, Table 5.29 summarized the research findings:

Table 5.29: Summary of Research Findings

Research hypothesis	Path coefficient	T Value	f^2	q^2	Research Finding
H_1: Perceived e-procurement system quality positively influences end-user satisfaction	0.339	4.545	0.072	0.068	Supported
H_2: Perceived e-procurement system quality positively influences trust	0.656	15.366	0.688	0.653	Supported
H_3: Perceived e-procurement system quality positively influences order fulfilment quality	0.736	29.100	—	—	Supported
H_4: Perceived order fulfilment quality positively influences end-user satisfaction	0.175	3.177	0.027	0.025	Supported
H_5: Perceived order fulfilment quality positively influences trust.	0.235	5.115	0.087	0.076	Supported
H_6: Trust positively influences end-user satisfaction	0.292	3.947	0.056	0.054	Supported
H_7: Trust mediates the relationship between perceived e-procurement quality and end-user satisfaction	0.530	10.546	—	—	Supported Partial Mediation
H_8: Trust mediates the relationship between perceived order fulfilment quality and end-user satisfaction	0.243	4.541	—	—	Supported Partial Mediation

SUMMARY

This chapter discussed the research data analysis by presenting the data preparation and the assessment of multivariate assumption. Furthermore, this chapter provided details on data analysis by using Partial Least Squires (PLS-SEM), and eight hypotheses have been tested by utilizing the measurement structural model assessment, with all of them being accepted and supported with empirical evidences. In addition, this chapter presented trust mediating analysis, Goodness of Fit, and the common method bias.

The following chapter will provide the research results' discussion, the contributions, the recommendations and limitations and proposed future researches.

5.8 Common Method Bias

Common method bias is a crucial issue for the measurement validity in self-reported studies. As the key informant method was utilized to obtain measurement scores for the independent and dependent constructs, the common method bias could possibly exist. Even though numerous attempts were already carried out to lessen such bias during the instrument development phase, such as performing content validity and enhancing item wordings to prevent social desirability, and the potential common method variance may not be totally avoided.

To determine whether common method bias is a serious issue in this study, Harman's (1976) one-factor test is among the most popular methods that deal with the matter of common method bias (Podsakoff et al., 2003). All constructs in the study are included in the exploratory factor analysis (EFA) (Jarvis et al., 2003). The results of this analysis on all the constructs indicate eight factors with eigenvalues of greater than (1), with no single factor emerging from the unrotated factor solution. The first factor accounted for less than 50% of the total variance, indicating a lack of a substantial common methods bias (Chengalur-Smith et al., 2010).

However, Djurkovic et al. (2006) mention that the absence of a single factor accounting for the majority of variance does not necessarily eliminate the possibility of common method bias. As a result, the procedure for identifying the method factor loadings discussed by Podsakoff et al. (2003) as controlling for the effects of an unmeasured latent methods factor was adapted for PLS, as suggested by Liang et al. (2007). In this procedure, two additional types of constructs are included in the model: individual constructs for each of the indicators in the model, and a single construct representing the common method factor for the model, reflected by all the indicators used in the model. Each individual indicator construct is then modelled reflecting both its intended construct and the common method factor construct. The square of the path weight from the common method factor to each single-indicator construct is interpreted as the variance in the indicator explained by common method variance, while the square of the path weight from the intended construct to the single-indicator construct is interpreted as the variance in the indicator explained by the intended construct. Using this procedure, only nine of the 44 method factor loadings on the single indicator constructs were significant. The average square of the path weight from the common method factor to the single-item indicator for all the paths was 0.007, as compared to 0.74 for the square of the path weight from the intended construct to the indicator. Taken in total, these findings indicate that common method bias is very unlikely to be a problem in this study.

CHAPTER 6

RESULTS AND DISCUSSION

INTRODUCTION

This chapter concludes and discusses the findings of the study. The chapter is divided into five sections. Section one provides an overview of the research, summarizing the research process. The second section presents the discussions and interpretations of the major results of this study. Meanwhile, the third section signifies the research implications for theory, methodology, and practices. Section four outlines the research limitations and recommendation for future research. Finally, section five concludes the study.

6.1 RESEARCH OVERVIEW

The primary purpose of this study is to evaluate the impact of e-procurement systems' qualities and trust on the e-procurement systems' end-user satisfaction in a mandatory system environment. Two main research questions are posed: (1) what are the e-procurement system qualities that influence trust and end-user satisfaction? (2) what is the impact of trust on end-user satisfaction? and (3) does trust mediate the relationship between e-procurement system qualities and end-user satisfaction? Based on these research questions, this study investigates the impact of e-procurement system qualities, namely perceived e-procurement quality, perceived order fulfillment quality, and trust on the dependent construct of the e-procurement systems' end-user satisfaction. In addition, the mediating effect of trust between the two constructs of perceived e-procurement quality and perceived order fulfillment quality and the dependent construct e-procurement system end-user satisfaction was investigated as well.

To answer these research questions, realize the objectives of this study, and empirically test the hypothesis, the study was conducted in three phases. This study begins with literature review on the latest peer-reviewed articles, books, journals, and dissertations in order to determine prior studies and their findings in relation to IS user satisfaction. Based on the literature, research gaps were identified, and a research model was constructed. This study did literature content analysis to identify the suitable factors that influence end-user satisfaction. The decision of choosing the suitable factors was mainly based on IS success model, which proposed several factors that affect the e-procurement systems' end-user satisfaction. From the content analysis, end-user satisfactions' are found to be a suitable representative of system performance and effectiveness in the context of this study, especially with regards to the mandatory use systems (Brown et al., 2002), as it was utilized as a surrogate to system performance (Ives et al., 1983). With reference to content analysis, three factors were found to influence the e-procurement system end-user satisfaction in mandatory use systems: e-procurement system quality, order fulfillment quality, and trust. Based on the literature and scholars recommendations, this study develops a research framework that represents the study constructs and their respective relationships.

The next phase involves the determination of the study sample, instrumentation, and data collection. The sample of this study was drawn from a population of non-technical end-users of the ePerolehan system in Malaysian governmental departments and agencies. A data collection instrument was adopted from several previous studies, with minor adjustments and further piloting. A questionnaire based on the proposed framework constructs was developed to collect the primary data for the study. Pre-testing for the questionnaire was conducted to confirm the face and content validity by a panel of experts in the information system field, and necessary suggestions were taken into consideration. A pilot study was conducted and primary internal consistency was investigated in order to ensure the reliability of the proposed constructs. Finally, a total of 1000 system end-users were randomly selected and requested to voluntarily complete a confidential questionnaire. The three months data collection period produced 432 responses, resulting in a return rate of 43%.

Finally, the last phase focuses on the study design and data analysis. This study is quantitative, with a deductive approach. The data were prepared using (SPSS) software to check the data outliers, normality, homoscedasticity, linearity and multicollinearity, and common method bias. Furthermore, (SPSS) were used to perform exploratory factor analysis (EFA) procedure, which is utilized to test the dimensionality of the data for the purpose of generating a set of items that represent the constructs. In addition, Partial least Squares (PLS-SEM) provide the statistical evidences of the validity and reliability of research model constructs. More importantly, (PLS-SEM) is used to assess the measurement and the structural model of the data and to test research hypothesis and provide empirical answers to the research questions. The final (PLS-SEM) structural model results proved that the relationship between trust and e-procurement system end-user satisfaction is rather significant. In addition, the relationship between perceived e-procurement quality and e-procurement system end-user satisfaction, as well as perceived order fulfillment quality and e-procurement system end-user satisfaction is statistically supported. Furthermore, the relationship between perceived e-procurement quality and perceived order fulfillment quality is also significant. In addition to the direct relationship between perceived e-procurement quality and trust, perceived order fulfillment quality and trust are reported to be significant. Finally, the role of trust as mediator between perceived e-procurement quality and e-procurement system end-user satisfaction, perceived order fulfillment quality, and e-procurement system end-user satisfaction is tested, and is found to be partially mediated.

The outcomes of the empirical analysis reveals that all research hypotheses are supported as presented in Table 6.1. The following section will discuss the findings in greater details.

Table 6.1:Summary of Research Findings

Research Questions	Research Objectives	Research hypothesis	Research Finding	Prior Research Findings
What are the e-procurement system qualities that influence trust and e-procurement system end-user satisfaction?	To examine the impact of e-procurement system qualities on trust and end-user satisfaction.	**H_1:** Perceived e-procurement system quality positively influences end-user satisfaction	Supported	McGill et al. (2003) Zhou (2013) Klobas & McGill (2010)
		H_2: Perceived e-procurement system quality positively influences trust.	Supported	Kassim et al.(2012) Vance et al. (2008) Zhou (2013)
		H_4: Perceived order fulfilment quality positively influences end-user satisfaction	Supported	Griffis et al. (2012) Vaidyanathan & Devaraj (2008)
		H_5: Perceived order fulfilment quality positively influences trust.	Supported	Bart et al. (2005)
	To examine the relationship between e-procurement system qualities	**H_3:** Perceived e-procurement system quality positively influences order fulfilment quality.	Supported	–
Does trust mediate the relationship between e-procurement system qualities and end-user satisfaction?	To investigate trust mediating effect between perceived e-procurement quality and end-user satisfaction	**H_7:** Trust mediates the relationship between perceived e-procurement quality and end-user satisfaction	Supported	Kassim et al. (2012)
	To investigate trust mediating effect between perceived order fulfilment quality and end-user satisfaction	**H_8:** Trust mediates the relationship between perceived order fulfilment quality and end-user satisfaction	Supported	–
What is the impact of trust on e-procurement system end-user satisfaction?	To examine the relationship between trust and end-user satisfaction	**H_6:** Trust positively influences end-user satisfaction	Supported	Kassim et al. (2012) Lu et al. (2012a) Balasubramanian et al. (2003)

6.2 DISCUSSION OF RESEARCH RESULTS

6.2.1 Perceived E-Procurement System Quality and E-Procurement System End-user Satisfaction

The findings proved the importance of e-procurement system quality, which is represented by its five dimensions: professionalism, processing, training, content and usability in improving and enhancing e-procurement system end-user satisfaction. In other words, in the context of e-procurement, it is crucial for the systems' users to perceive different system qualities, such as professionalism, processing, training, content and usability to generate and enhance the system end-user satisfaction impact. For example, when the system end-users perceived that the technical staff are professionals, supportive, and responsive to their inquiries and the systems' problems on time, they will perceive positively the quality of e-procurement system, and will in turn leverage the e-procurement systems' end-user satisfaction. Moreover, when the systems' end-users perceived that their work skills of using the e-procurement system is improved from the frequent and up-to-date training sessions and system manuals, their perception of system quality will improve, which will influence the e-procurement systems' end-user satisfaction.

The importance of the perceived system quality is also highlighted by Wang and Liao (2008) in the e-government context, who found a positive relationship between system quality and system user satisfaction. Moreover, the study finding is also consistent with, and reaffirms the findings of previous studies in different IS contexts, such as mobile payment services context (Zhou, 2013), e-learning context (Klobas and McGill, 2010), and user-developed applications (McGill et al., 2003). All previous studies confirm the influence of system quality construct on system end-user satisfaction; however, the distinction between the previous studies and this study lies in the operationalization of system quality construct. This study operationalized the perceived e-procurement system quality as multidimensional construct that is represented by its five dimensions: professionalism, processing, training, content and usability; Zhou (2013) operationalized system quality as one construct with muti-items. Therefore, in the light of previous studies' findings and this study's findings, it is obvious that system quality is a salient determinant of IS systems regardless of the system and the method of operationalizing the construct.

6.2.2 Perceived E-Procurement System Quality and Trust

The findings of this study provide evidence on the significant impact of perceived e-procurement system quality on end-users' trust toward the e-procurement system. However, it is obvious that system end-users trust is a crucial factor in information systems in general and online systems in particular. In addition, it is vital to trust the system under mandatory use environment, because system users must use the system. Trust is critical in e-procurement systems, as one of online mandatory systems that facilitate the interaction between several parties, such as buyers and suppliers. The findings of this study highlighted the fact that perceived e-procurement system quality is a salient determinant that influences trusts in mandatory use systems. For example, when end system users who deals directly with e-procurement system find that the content of the system is adequate and accurate when placing orders, their trust towards the system will improve.

The finding of this study is supported by some scholars who regard trust as a product of positive belief in the systems' characteristics, information, and the honesty of the suppliers (Kini and Choobineh, 1998; Sambasivan et al., 2010). In addition, the outcome of this study is found to be consistent with earlier empirical studies in different information systems contexts under non-specified usage environments. For example, Kassim et al. (2012) found a significant positive relationship between system quality and trust in a context of students information systems. In information technology artifacts, Vance et al. (2008) found that the perception of system quality has a significant positive influence upon user trust. Furthermore, recent studies by Zhou (2013) in the context of mobile payment services proved that system quality impact users' trust. Although the finding of previous studies were found to be consistent with the findings of this study, the usage environment of this study as a mandatory use system was found to be unique due to the fact that previous studies failed to specify the usage environments. As a conclusion, system quality is an important determinant of users' trust towards the information systems in general, and e-procurement system under mandatory environment in particular.

6.2.3 Perceived E-Procurement System Quality and Order Fulfillment Quality

The findings of this study support the relationship between perceived e-procurement system quality and perceived order fulfillment qualities. Although there were no prior empirical evidence on the influence of perceived e-procurement system quality by systems' users on order fulfillment quality by supplier as perceived by the e-procurement system users in e-procurement context, this study was able to test the relationships. The relationship was found to be significant. There are qualitative evidence, as suggested by Heikkilä (2002) and Muffatto and Payaro (2004), who emphasized the influence of one quality to the other in a supply chain, and thus in e-procurement environment. Therefore this study provides new evidence that e-procurement system qualities represented by perceived e-procurement system quality and perceived order fulfillment quality are directly related.

In this study, the e-procurement system facilitates the communication and the interaction between the main system parties' buyers and suppliers. Therefore, the quality of the system will affect buyers who will use the system to place orders, as well as the suppliers who will receive orders from the buyers to fulfill them. As a result of this, the quality of the relationship and communication between both parties' buyers and suppliers depends on the quality of the system and the quality of the information flowing between both parties. In other words, the quality of order fulfillment by suppliers as perceived by the buyers' end system users' in this study is the product of the quality of the e-procurement system itself. If the quality of the e-procurement system is high, then the quality of the order fulfillment will also be high. This supposition is supported by Harrington (2000), who states that among the issues resulting in the failure of e-procurement is the lack of ability to match or exceed buyer expectations in terms of fulfillment, which indicate that one of the reasons for e-procurement systems' failure is due to the poor order fulfillment from the suppliers side that is related to the quality of the e-procurement system in general.

6.2.4 Perceived Order Fulfillment Quality and E-Procurement System End-user Satisfaction

The findings of this study prove the importance of perceived order fulfillment quality represented by its two dimensions: order accuracy and order timeliness in improving and enhancing e-procurement systems' end-user satisfaction. This relationship is confirmed by Brandon-Jones and Carey (2011), who emphasized that order accuracy and the timeliness of delivery relies on the suppliers, and the effectiveness of the capability of e-procurement system leads to improve these areas. The order fulfillment function starts when a buyer decides to purchase and ends when the product, or service is received by the buyer. Thus, the quality of this function will affect buyer perception of order fulfillment quality, and then the e-procurement system end-user satisfaction.

Obviously, when the buyers' 'system user' perceived that the order placed by them is fulfilled accurately and punctually by the supplier, they will be satisfied in using the system, and will have improved opinions vis-à-vis the systems' end-user satisfaction. This finding is similar to the outcome of previous studies by Griffis et al. (2012) and Vaidyanathan and Devaraj (2008), who confirmed the positive relationship between order fulfillment and system user satisfaction. This finding is also mentioned by Mentzer et al. (2001), who confirmed that businesses realizes customer satisfaction when provided with high degrees of logistics service qualities, such as customer service, ordering procedures, order accuracy, order timeliness, order condition, order availability, information quality, and discrepancy handling. The usage environment of the previous studies was not specified. Thus, this study's finding is unique, as it investigates the mandatory use of e-procurement systems. Consequently, perceiving supplier's order fulfillment quality affects the e-procurement system end-user satisfaction positively in a mandatory use environment.

6.2.5 Perceived Order Fulfillment Quality and Trust

The findings of this study approve of the relationship between perceived order fulfillment quality and e-procurement system end-users trust toward the e-procurement system. Again, trust is critical in an e-procurement system, as one of the online mandatory systems that facilitates the interaction between several parties, such as buyers and suppliers. Simultaneously, trust is based on experiences, as emphasized by Blomqvist (1997). As argued by Urban et al. (2009), in an online environment, trust is developed when a buyer has a positive experience with the supplier via order fulfillment, service, and product quality. Thus, the end users of the e-procurement system will directly experience the performance of suppliers when they place orders for items. Therefore, the perception of order fulfillment quality by the system users 'buyers' will form their trust towards the e-procurement system. When a buyer's perception of supplier order fulfillment is high, a buyer believes that the supplier has the strength and appropriate capabilities related to order fulfillment, and is assured that they will receive the product on time.

The result of this study is consistent with the study by Bart et al. (2005), who found that order fulfillment is the dominant factor that affects trust in an online travel services voluntary context. The result of Bart et al. (2005) is consistent with our study findings, because both studies deal with online environment systems, which provide for electronic interaction between several parties. As such, online interactions require trust between system users regardless of the nature of the system usage environment (mandatory or voluntary). However, the finding of our study is important because in a mandatory use system, system users are compelled to use the system. Thus, it is crucial in this case to enhance system end-users trust to leverage end-user satisfaction.

6.2.6 Trust and E-Procurement System End-user Satisfaction

The finding of this study provides evidence that e-procurement system end-users trust has a positive influence on the e-procurement systems' end-user satisfaction. This relationship is confirmed by Gefen et al. (2003), who emphasized that trust is a critical key that plays a significant role in predicting users' behavior in an IS context. The lack of trust in an e-procurement systems has been presumed as the main reason for the resistance of users to in using it (Kusuma and Pramunita, 2011). Therefore, when system users believes that the e-procurement system is untrustworthy, they will bypass its usage by finding other ways to fullfil their work requirement, such as dealing manually with suppliers outside the system boundaries, which will impact the system performance in a negative way. Other users may not use the full capacity of the e-procurement system, which will also affect the e-procurement systems' performance. Therefore, the finding indicates that in mandatory uses of e-procurement system context, it is crucial to enhance and leverage the system users' trust in order to achieve an acceptable system satisfaction.

This finding is consistent and confirms prior information system studies under voluntary or non-specified usage environment. For example, Kassim et al. (2012) reported the positive relationship between trust and system user satisfaction in a student information system context, while Lu et al. (2012a) reported the positive relationship between trust and user satisfaction in C2C platform. Finally, Balasubramanian et al. (2003) reported the significant relationship between trust and online investing satisfaction. It is plausible that trust plays a significant role in improving end-user satisfaction regardless of the information systems' type or the usage environment. However, this result is found to be unique in the e-procurement system mandatory context, as no study found investigated this relationship in a mandatory use environment.

6.2.7 The Mediating Effect of Trust

Based on previous studies in an IS context, trust was found to play a crucial role in e-commerce and online environments. Therefore, this study hypothesizes that the effect of trust in e-procurement systems may extend from only having direct relationships with e-procurement system qualities and e-procurement system end-user satisfaction to play a mediating role between both.

Therefore, this study proposed two hypotheses: firstly, trust mediates the relationship between perceived e-procurement quality and e-procurement system end-user satisfaction. This relationship can be explained when system end-users trust improves due to the perception of e-procurement system quality and influences the e-procurement systems' end-user satisfaction. Secondly, trust mediates the relationship between perceived order fulfillment quality and e-procurement system end-user satisfaction. This relationship can be explained when the system end-users trust improves due to the perception of order fulfillment quality of the suppliers, which in turn influences e-procurement systems' end-user satisfaction.

After testing the mediation effect in chapter 5, the findings revealed that trust partially mediates the two relationships. Thus, it can be assured that trust, to some extent, mediates the relationship between both system qualities; perceived e-procurement system quality, perceived order fulfillment quality, and e-procurement system end-user satisfaction. This study evaluates limited trust environment by evaluating the trustworthiness of e-procurement system in general and the system suppliers only, this finding may indicate that other trust environments may enhance and improve the mediating effect in an e-procurement environment (eg. trust system content and information, trust technical support, trust system vendors).

Based on our knowledge, there was no quantitative evidence in the context of e-procurement system that trust mediates the relationship between system qualities and end-user satisfaction. However, referring to previous literature, we find one study that investigated trust mediation effect in the context of student information system, conducted by Kassim et al. (2012), who investigated the mediation effect of trust between system acceptance constructs and student information system satisfaction. In his study, Kassim found that trust has a mediating effect between system acceptance constructs representing system and information quality with user satisfaction. Therefore, in his study, trust is considered a vital driver for user acceptance and satisfaction, and he justified this finding by regarding trust as a need for dealing and interacting with the system. On the other hand, in our study, trust derived from e-procurement system end-users experiences and belief of the system and suppliers as the e-procurement system is mandatory use system in the post-implementation stage, and the acceptance is not an issue in this study. Thus, evaluating trust is based only on the end-users direct interaction with the system.

6.3 IMPLICATIONS OF THE STUDY

6.3.1 Implications for Theory

This study contributes to the knowledge by adopting IS success model (Delone, 2003; DeLone and McLean, 1992) to assess end-user satisfaction ‘attitude’ and by introducing trust ‘belief’ to it. This study employs IS success model to examine the impact of nontechnical end-users direct and indirect experiences with e-procurement systems qualities being represented by the perceived e-procurement system quality and perceived order fulfillment quality on e-procurement systems end-user satisfaction. More importantly, this study shows that users’ experiences with the e-procurement system ‘perceived e-procurement system quality’ and ‘perceived order fulfillment quality’ influence system end-users belief ‘trust’ toward the system. From a predictive perspective, introducing trust to IS success model provides researchers and practitioners with a fundamental understanding that the system qualities are crucial in determining users’ trust as well as end-user satisfaction in e-procurement system context. Therefore, from predictive perspectives, evaluating end-user experiences with e-procurement system can be regarded as a base line of determining system user trust toward the system and e-procurement system end-user satisfaction.

Moreover, this study contributes to the current theory by investigating the research model from e-procurement nontechnical end-users who directly interact with e-procurement system, while only a few studies compiled from literature search focused on post-implementation at the individual level (Díez and McIntosh, 2009). Nontechnical end-users of e-procurement are found to be the most suitable respondents to this study, as they form a buyer base by representing their agencies and departments; in addition, they are interacting directly with the system and suppliers, thus, they can evaluate the actual quality of the system based on their experiences. According to DeLone and McLean (1992), user perceptions of system quality represent ‘actual’ system quality. Therefore, this study evaluates nontechnical end-users direct experiences with the e-procurement system represented by ‘perceived e-procurement systems quality’, as well as the indirect experiences represented by ‘perceived order fulfillment quality’ and the end-users belief ‘trust’ toward the system and their impact on e-procurement system end-user satisfaction.

In addition, this study concentrates on e-government procurement system in one of the developing countries, e.g. Malaysia. It is significantly noted that little research has been carried out in developing countries. It is plausible that developing countries are different from developed countries in terms of political, social, administrative, and economic characteristics, such as the nature of the economy (Palekar, 2012). Obviously, the differences between developed and developing countries’ cultures impact the usage and the perception of the technology. This study investigates the effect perception of e-procurement system qualities on trust, and e-procurement system end-user satisfaction from nontechnical end-users perspective in developing countries.

This study presents a unique evaluation of mandatory use system as the e-procurement system under investigation in this study is under mandatory use environment. Limited attention has been committed to knowing technology adoption in a mandatory use environment (Chan et al., 2010; Jasperson, 2005); while this study determined suitable constructs that facilitate the evaluation of mandatory use environment by using end-users satisfaction as a surrogate to the system performance. Brown et al. (2002) argued that user satisfaction had an exclusive and essentially critical role in evaluating system success in mandatory contexts, for example, in government systems. Earlier researchers, such as Brown et al. (2002) and Lu et al. (2012b) allude to the importance of evaluating mandatory use environment. Brown et al. (2002) pointed out that mandatory use environment suffers from the lack of established theoretical systems, while the majority of previous researches have been conducted in the voluntary adoption context, and the usefulness of earlier investigations to the mandatory use context is not clear (Chan et al., 2010). Brown et al. (2002) stated that previous technology adoption models are unsuitable to be examined under mandatory system use environment. Therefore, this study contributes to the mandatory use systems environment by introducing trust to IS success model by investigates the impact of system end-users experiences with e-procurement system qualities and their impact on system users trust and e-procurement system end-user satisfaction.

Moreover, this research contributes to the theories by concentrating on e-government, particularly Government to Business (G2B) environment. Apparently, e-government and e-business may be similar in terms of underling technologies, but their reasonable grounds are very dissimilar (Srivastava and Teo, 2010). While e-businesses are created for promoting commercial activities online by relying on private sector investment (Srivastava and Teo, 2010), e-government is adopted to provide services to citizen and businesses by operating public funds (Raymond, 2008). Bauld and McGuinness (2006) demonstrated that value of money in the public sector requires suitable efforts that can enhance and progress governmental regulations and guidelines in order to realize the most desirable return and performance for the money being invested. To make sure that e-government is successful, it is essential to evaluate its effectiveness, therefore, suitable reactions will be based on these evaluations (Gupta and Jana, 2003). Investigation on e-procurement in public sector is found to be very limited (Aini and Hasmiah, 2011; Croom, 2000; Tonkin, 2003); and at the same time, investigating e-government systems’ success remains unclear (Wang and Liao, 2008), little is recognized with regards to the performance and effectiveness of public online systems (Torres et al., 2005). Thus, this study constructs a theoretical framework and evaluated the performance and effectiveness of e-procurement system under e-government G2B environment by providing an empirical evidence of the factors that impact the end-user satisfaction of e-government systems. The study model provides fruitful ideas to the academic community to replicate, improve, and apply the model in different e-government and e-procurement contexts, as the e-procurement system is one of the integrated systems of e-government environment.

This research offers a unique linkage among study constructs by testing the relationship between e-procurement system quality, order fulfillment quality, and trust with e-procurement system end-user satisfaction. Within the literature, studies investigating information system factors that influences e-procurement system end-user satisfaction represented by end-user satisfaction under mandatory use systems are limited (Brown et al., 2002). Goodhue (1995) mentioned the fact that researchers proposal of higher performance of information system performance resulting in higher user satisfaction has not been conclusively proven in past researchers . The adoption and use of e-procurement has been prevalent in supply chain management, and there is very little research examining the critical role of quality in e-procurement context (Vaidyanathan and Devaraj, 2008). This study provides empirical evidence that e-procurement system qualities have a direct impact on e-procurement system users' trust and the e-procurement system end-user satisfaction.

This research first empirically analyzed the influence of perceived e-procurement quality construct, which has a unique operationalization by its five universal dimensions introduced recently by Brandon-Jones (2006) with other study constructs e.g., e-procurement system end-user satisfaction, trust, and perceived order fulfillment quality. It is important to categorize and differentiate between e-procurement systems qualities due to the nature of e-procurement environment, which deals with two parties “buyer and suppliers”; therefore, each party can evaluate the quality of their direct interaction with the system, as well as the performance of the other party using the same system. In this study, non-technical e-procurement system end-users who represent the buyers’ side are found to be the suitable population for this study, as they are capable of evaluating the quality of the e-procurement system, as well as the quality of the suppliers’ performance by evaluating the order fulfillments’ quality.

Most importantly, this study is regarded as the first one to empirically evaluate and analyze the relationship between direct system quality represented by ‘perceived e-procurement system quality’ and indirect system quality ‘perceived order fulfillment quality’. Thus, the finding of this relationship revealed that direct quality influences indirect quality. In other words, the higher the direct system quality being represented by the perceived e-procurement quality will positively affect the perception of the indirect system quality represented by the order fulfillment quality. This result is crucial for managers who are seeking to improve both direct and indirect system qualities by solving the issues related to each quality.

Finally, this study provides empirical results that confirm the mediation effect of trust construct between system qualities and e-procurement system end-user satisfaction. In the literature, little research evaluated the mediation effect of trust. However, in e-procurement system and according to our knowledge, no previous study examined the mediation effect of trust between system qualities and system end-user satisfaction under any information system in general and e-procurement system in particular. The result of the mediation effect of trust contributes to the body of knowledge by leveraging the role of trust in an e-procurement context.

6.3.2 Implications for Methodology

This research adopts a positivist perspective and quantitative deductive methodology to investigate e-procurement system end-user satisfaction as a form of human attitude and one of the social realities that can be objectively measured by employing standard scientific methods by third parties who work as real observers.

This study has significant methodological implications for system qualities constructs. The study operationalizes system qualities; perceived e-procurement quality, and perceived order fulfillment quality as a second-order formative constructs based on systematic decision rules (see chapter 4 section 4.2.1). The systematic decision rules facilitate the identification of the nature of construct measurement; it proves that the five dimensions; professionalism, processing, training, content, and usability represents and defines the ‘perceived e-procurement system quality’ construct, while the two dimensions: accuracy and timeliness represents and defines the ‘perceived order fulfillment quality’ construct. This is contrary to previous studies that operationalized information systems quality as one first-order reflective construct and were focused on recognizing individual items (Ives et al., 1983; Larcker and Lessig, 1980; Swanson, 1982), and adds on other studies measuring information systems quality as a second-order reflective construct consisting of several first-order reflective dimensions (DeLone and McLean, 1992; Doll and Torkzadeh, 1988). It is crucial to identify the nature of items and/or dimentions of the construct. Edwards and Bagozzi (2000) emphasized that the misidentification of the formative and reflective constructs may lead to type I and type II errors, which might negatively influence the theory advancement due to generating inappropriate outcomes. For this reason, the relationships amongst the constructs and their measures need to be viewed as hypotheses that require the evaluation along with the structural paths (Edwards and

Bagozzi, 2000). Therefore, the operationalization of e-procurement system qualities as a second-order formative constructs makes the study analysis and findings unique.

6.3.3 Implications for Practice

The results of this study provide both managers and system providers with the guidelines that may improve and enhance e-procurement systems' end-user satisfaction. Internal customer satisfaction "user satisfaction" forms the main concern of any organization (Croom and Brandon-Jones, 2005); at the same time, it can be seen as a surrogate of system performance (Ives et al., 1983). E-procurement system facilitates the interaction between the two parties' buyers and suppliers, this study concentrates mainly on the buyers' side of the perceived and evaluated quality of the system "perceived e-procurement quality system" and the performance of supplier side "perceived order fulfillment quality."

Based on the findings, some recommendation can be provided to managers as well as system providers who are seeking to improve e-procurement system performance as well as end-user satisfaction in mandatory use environment. Therefore, this study provides evidence for the role of three vital factors; e-procurement system quality, order fulfillment quality, and trust, all of which have a considerable impact on the end-user satisfaction of e-procurement.

This study provides the managers and system providers with the road map that presents the importance of perceived e-procurement quality in elevating and improving e-procurement system end-user satisfaction, as well as users trust. Furthermore, this study deals with five crucial dimensions of e-procurement system quality: professionalism, processing, training, content and usability. The study findings show that professionalism is an important factor that represents e-procurement system quality; therefore, managers and service providers should pay attention in preparing a technical team in each organization to provide their support and respond to system users' problems and inquiries on time. System providers, side-by-side with organization managers, have a crucial responsibility towards preparing and training technical professional internal team in handling and dealing with the technical aspects of the system. In addition, system provider and internal technical team should have a frequent and strong relationship in order to allow them to cooperate and solve emergency system issues. Consequently, when system users perceived the internal service quality, which is provided by internal and external technical system team, they will trust the system and will be satisfied with their work condition as well as work procedures and positively enhance e-procurement system end-user satisfaction.

Processing is another system quality dimension that requires managers' and system providers' attention. Obviously, an e-procurement system deals with huge numbers, complex and high budget orders; thus, the system should be prepared to deal with all possible work cases (e.g., highest order quantity/day or high possible complex orders). Despite the fact that the quality of system processing remains the responsibility of the system provider; the managers of e-procurement department have to evaluate the system processing frequently before and after releasing and using the system. Thus, they should provide the system provider with their periodic and frequent report of the capability of system processing in order to improve it as needed. Undoubtedly, system processing affects users perception of the system, when the user places orders with the system, they will evaluate the way the system process the orders; consequently, if the user has a good and satisfying experience with the way the system process and handle work procedure, they will trust and be satisfied with using the system.

Training system users is the most important dimension, thus, when organizations decide to mandate the use of any system, they should provide system users with a comprehensive, detailed, and frequent training of how to use the system; in addition, it should train the users on new work tasks procedures. Naturally, any system requires frequent improvements and updates to fulfill the new work and users' needs, in addition to tackling system errors and problems. Consequently, frequent and up-to-date system training should be held to provide the users with the latest system features, work tasks, and procedures. Thus, providing users with adequate and suitable training will build up their trust and improve their skills in handling and using the system in a flexible way and perceive control over the system.

Moreover, e-procurement system is an interaction system between buyers on one hand, and suppliers on the other. The adequacy of system information content is essential to facilitate the interaction between both parties. From buyer "user" side, to place an order, information about approved suppliers is important, as well as the provision of e-catalogues, which contain important information about product items and prices. The availability of suitable information content in both quantity and quality would help system users minimize efforts and time in searching for information offline or by faxing and calling the supplier. At the same time, the adequacy of system content reduces the cost of paper work, telephone line, and transportation. Obviously, providing adequate content is the responsibility of the suppliers as well as organizations; however, the owner of the system – the Malaysian government in our case- has to encourage the suppliers to upload up-to-date information about their products and services and prices by providing them with adequate manuals and training sessions. On the other hand, the managers of procurement departments should upload the information that is requested by suppliers to the system in order to fulfill the placed orders.

System usability, as one of the dimensions of system quality, is crucial for all systems in general, and mandatory use systems in particular. The system provider, alongside the organization manager, should advance and improve the usability of the system by providing the users with flexibility ease of interaction, user friendly, and ease of navigation across the system. When system users deal with useable system, they will utilize all of the system’s features to execute their work, and when it is available, the users will not search for another way to place orders. It is recommended that organization managers and system providers pay attention to the usability of mandatory use system by providing the users with flexible, friendly, and easy-to-use system to guarantee the commitment of the users in using the system.

On the other hand, organizations’ managers can contribute to the improvement of suppliers order fulfillment quality by approving the suppliers who have a good fulfillment quality history, or those who can commit to the fulfillment agreement. This can be achieved by evaluating the supplier fulfillment after each order fulfillment by posting the evaluation in the system, and this evaluation will be linked to the supplier profile in the system, and can be accessed by all system users e.g. buyer. In this case, when any user of e-procurement system ‘buyer’ wants to place an order with a specific supplier, they can review the supplier’s profile fulfillment history. Based on supplier fulfillment history, the buyer has the choice to deal or not to deal with that particular supplier. This procedure will encourage the suppliers to compete in improving their profile fulfillment history by providing the buyers with quality fulfillment services.

In line with the previous discussion, it is plausible that paying attention to system qualities ‘e-procurement system quality’ and ‘order fulfillment quality’ in an e-procurement context will positively affect users trust towards the system, and leverage system end-user satisfaction.

6.4 STUDY LIMITATIONS AND FUTURE RESEARCH

There are several limitations to this study, which will be discussed together with the recommendations for future research.

The research framework of this study empirically provides evidence of the influence of e-procurement system qualities and trust on the e-procurement system end-user satisfaction is investigated in the context of developing country, e.g. Malaysia. It is plausible that developing countries are different from developed countries and undeveloped countries in terms of political, social, administrative, and economic characteristics, such as the nature of economy, the level of technology, and the quality of human resources etc. (Palekar, 2012). Those differences may have significant influence on the research model's results. To improve the generalizability of the results, the replication of study framework in different contexts like developing countries or undeveloped countries, will undoubtedly contribute to the generalizability of the study results. In addition, performing comparative studies between different contexts will enhance the understanding of the context differences.

There is also limitation to the domain of the research constructs. This study introduces the determinants that influence e-procurement systems end-user satisfaction by performing content analysis (see chapter 2). The selection criteria in this study will be based on the most suitable factors that represent information systems in general and e-procurement systems in particular. However, it is obvious that other factors also influence the proposed dependent constructs (e.g., e-procurement system end-user satisfaction) in this study. Although this study did not account for all of the possible variables, there might be some other variables that may contribute to the system's end-user satisfaction. There may be additional essential new factors that need to be considered. As such, for future study, it is recommended that other constructs that may affect systems' end-user satisfaction be identified (e.g., perceived risk, and perceived system benefits).

This study introduces two types of e-procurement system qualities, namely direct system quality represented by perceived e-procurement system quality, and indirect system quality represented by perceived order fulfillment quality that were found to influence trust and e-procurement system end-user satisfaction. As e-procurement system has different models of applications and functions, each model may require the investigation of specific qualities that represent the model. For instance, the 'ePerolehan' system consists of six modules, namely central contract, direct purchase, and quotation, tender, and electronic reverse auction, or eBidding. Therefore, e-procurement system quality can be customized to represent different models of the e-procurement system. Thus, future research can broaden the e-procurement systems' qualities dimensions. In addition, this study evaluates order fulfillment quality by investigating delivery accuracy and timeliness, which reflect just two functions from supplier performance; additional dimensions can be introduced to give some breadth to this construct (e.g., order condition, order discrepancy etc.)

This study investigates and tests the impact of perceived e-procurement system quality on perceived order fulfillment quality and their direct impact on trust and e-procurement end-user satisfaction. However, this study did not test the impact of these two dimensions of quality upon each other. As such, this study suggest that future studies should focus on the mediating effect of perceived order fulfillment quality on the relationship between perceived e-procurement system quality with trust and e-procurement end-user satisfaction, due to the lack of theoretical support from literature. It is recommended that future research should emphasized justifying and testing the indirect relationship between e-procurement system quality with trust and e-procurement system end-user satisfaction by the mediating role of the order fulfillment quality. This investigation may add another breadth to e-procurement system context.

This study adopts user satisfaction as a nonfinancial surrogate measure of e-procurement system performance. As there are several financial and nonfinancial measures of system performance, future researches may replicate the study framework by adopting other financial and/or nonfinancial performance measures (e.g., return on investment, users' loyalty, users' performance, operational performance, cost reduction). Using different performance measures may improve the understanding of the impact of system qualities determinants and trust on different system performance.

The targeted respondents of this study are direct nontechnical end-users of the e-procurement system. However, other internal indirect users of the system may have their own perspective, such as top managers who deal with advance reports from the system. In addition to the technical end-users of the system who experience issues with the system, thus they can provide their technical perspective of the quality and the performance of the e-procurement systems. Therefore, in the future, targeting other system users' e.g. top management or technical users can conduct further investigation of the research framework.

This study is designed under quantitative deductive and cross-sectional time horizon that was found to be suitable for investigating the current 'ePerolehan' system. However, future researches can adopt other research design that can be used to test and investigate e-procurement systems, like a longitudinal study that can contribute to the understanding of the impact of system improvement in different periods of time. For instance, qualities constructs can be investigated in two different period of time to test the impact of the progress and the improvement of e-procurement system qualities, and their impact on trust and end-user satisfaction of e-procurement systems. For example, one can investigate system user's perception before using the system, during training, and after training.

6.5 CONCLUSION

The main aim of this study is to investigate the impact of the e-procurement system qualities and trust on the e-procurement system end-user satisfaction, in a mandatory system environment. In line with this objective, three research questions are established: **First**, what are the e-procurement system qualities that influence trust and end-user satisfaction? **Second,** what is the impact of trust on end-user satisfaction? **Third,** does trust mediate the relationship between e-procurement system qualities and end-user satisfaction? This study postulates that suitable e-procurement system qualities and trust, as perceived by system end-users, have influence on the e-procurement system end-user satisfaction.

IS success model is adopted to describe the causal linkages between the determinants that affect e-procurement system end-user satisfaction. This research study investigates end-user's experiences with e-procurement system and their impact on user's belief 'trust' to evaluate e-procurement system end-user satisfaction. The users' experiences are classified into direct user's experience with the system, represented by perceived e-procurement system quality construct, and indirect user's experiences, represented by perceived order fulfillment quality of suppliers as perceived by system end-users ['buyers'].

A questionnaire that reflects the proposed framework constructs is developed to collect the primary data for the study. The data is collected from 432 e-procurement system users who are working at the purchasing departments in Malaysian governmental Ministries, Agencies, and Departments. This study is quantitative with a deductive approach. It employs partial least squares structural equation modeling (PLS-SEM) to validate and confirm research model to test the relationships being hypothesized.

The findings of this study provide empirical evidence for the significant impact of perceived e-procurement system quality, perceived order fulfillment quality, and trust on e-procurement end-user satisfaction. Furthermore, the study findings approve the influence of both system qualities, namely perceived e-procurement quality and perceived order fulfillment quality on trust. The findings reveal that perceived e-procurement quality positively influences perceived order fulfillment quality. Finally, trust is found to have partial mediating effect between system qualities and e-procurement system end-user satisfaction.

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APPENDIX A

Research Questionnaire Set

A-1: Cover letter to Respondents

Dear Respondent,

My name is Manal Sharabati. I am a PhD candidate from the Business and Accountancy Faculty, University of Malaya under the supervision of Professor Dr. Ainin Sulaiman and Dr. Noor Akma Mohd. Salleh. As part of my degree fulfillment, I am required to conduct an empirical research entitled **"The Impact of Improving E-procurement System Usage on System Performance."** For that purpose, I have designed a questionnaire to collect the required data. The findings of this study will be useful for planning, managing and improving the usage of e-procurement systems in Malaysia. I would like to invite you to be a part of this research study by sharing your valuable experience and opinion about the use of e-procurement system.

Please note that all information provided in this survey is **STRICTLY CONFIDENTIAL** and will only be used for the purpose of this research. Your response will be used in an aggregate form and **at no time your response will be identified in any report**.

Thank you for your time and cooperation.

Yours sincerely,
Manal Sharabati
Faculty of Business and Accountancy
University of Malaya
E-mail: manals@gmail.com

A-2: Sample of Survey Instrument

On the scale **(1 to 7)** where 7 represents **"strongly agree"** and 1 represents **"strongly disagree"** how would you rate each of the following statements? (Kindly circle only one number for each item).

SECTION A: PERCEIVED E-PROCUREMENT QUALITY

#	*Questions*	Strongly Disagree	Somewhat Disagree	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
	➢ ***The procurement division***							
1	... is always available to deal with my queries or problems.	1	2	3	4	5	6	7
2	... always gets back to me when they say they will.	1	2	3	4	5	6	7
3	... responds quickly to my queries or problems.	1	2	3	4	5	6	7
4	... is flexible when dealing with unusual requests or problems.	1	2	3	4	5	6	7
5	... is knowledgeable in dealing with my queries or problems.	1	2	3	4	5	6	7
6	... deals effectively with any problems.	1	2	3	4	5	6	7
7	... deals confidentially with my queries or problems.	1	2	3	4	5	6	7
8	... shows concern when dealing with my queries or problems.	1	2	3	4	5	6	7
9	... is friendly when dealing with queries or problems.	1	2	3	4	5	6	7
10	... provides me with timely training to use the system.	1	2	3	4	5	6	7
11	... provides useful information about the system during the training.	1	2	3	4	5	6	7
12	... provides me with appropriate and specific training to use the system.	1	2	3	4	5	6	7
13	My level of understanding was improved after going through the training program.	1	2	3	4	5	6	7
14	The training gave me confidence in using e-procurement system.	1	2	3	4	5	6	7
15	The training was very detailed and at adequate length.	1	2	3	4	5	6	7
16	My interaction with e-procurement system is clear and understandable.	1	2	3	4	5	6	7
17	It was easy for me to become skillful at using the e-procurement system.	1	2	3	4	5	6	7

#	Questions	Strongly Disagree	Somewhat Disagree	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
	➢ ***The e-procurement system***							
18	... moves smoothly from one screen to the next.	1	2	3	4	5	6	7
19	... allows easy navigation through the process.	1	2	3	4	5	6	7
20	... is available at all times.	1	2	3	4	5	6	7
21	... is easy to use.	1	2	3	4	5	6	7
22	… is flexible to interact with.	1	2	3	4	5	6	7
23	... has an efficient authorization process.	1	2	3	4	5	6	7
24	... is capable of processing complex orders.	1	2	3	4	5	6	7
25	... reduces the lead-time of orders.	1	2	3	4	5	6	7
26	... is secure in processing procuring transactions.	1	2	3	4	5	6	7
27	... is capable to ensure that the right goods or services are delivered.	1	2	3	4	5	6	7
28	... is capable to ensure that orders arrive on time.	1	2	3	4	5	6	7
29	... is capable to ensure that orders are processed quickly.	1	2	3	4	5	6	7
30	... is capable to ensure that orders get to suppliers quickly.	1	2	3	4	5	6	7
31	... has the right number of suppliers registered.	1	2	3	4	5	6	7
32	... has the right number of catalogues uploaded.	1	2	3	4	5	6	7
33	... allows easy searching for suppliers or items.	1	2	3	4	5	6	7
34	... provides the accurate information I need.	1	2	3	4	5	6	7
35	... provides information content that meets my needs.	1	2	3	4	5	6	7
36	... provides reports that meets my needs.	1	2	3	4	5	6	7
37	... provides sufficient information.	1	2	3	4	5	6	7

SECTION B: ORDER FULFILLMENT QUALITY

#	*Questions*	**Strongly Disagree**	**Somewhat Disagree**	**Disagree**	**Neutral**	**Somewhat Agree**	**Agree**	**Strongly Agree**
	➢ ***By using e-procurement system***							
1	… shipments rarely contain wrong items.	1	2	3	4	5	6	7
2	... shipments rarely contain incorrect quantity.	1	2	3	4	5	6	7
3	... shipments rarely contain substituted items.	1	2	3	4	5	6	7
	➢ ***After participating in an e-procurement system***							
4	... time between placing requisition and receiving delivery is short.	1	2	3	4	5	6	7
5	... deliveries arrive on the date promised.	1	2	3	4	5	6	7
6	... the amount of time a requisition is on back-order is short.	1	2	3	4	5	6	7

SECTION C: TRUST

#	*Questions*	Strongly Disagree	Somewhat Disagree	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1	The e-procurement system is reliable.	1	2	3	4	5	6	7
2	The information available on the e-procurement system is trustworthy.	1	2	3	4	5	6	7
3	The e-procurement system can be trusted to carry out online transactions faithfully.	1	2	3	4	5	6	7
4	From my experience, e-procurement system is trustworthy.	1	2	3	4	5	6	7
5	Our suppliers are honest in dealing with us at all times.	1	2	3	4	5	6	7
6	Our suppliers keep their promises and commitments.	1	2	3	4	5	6	7

SECTION D: USER SATISFACTION

#	*Questions*	Strongly Disagree	Somewhat Disagree	Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
	➢ ***Using e-procurement system in my job***							
1	I am very pleased with using e-procurement system in my work.	1	2	3	4	5	6	7
2	My interaction with e-procurement system is very satisfying.	1	2	3	4	5	6	7
3	All things considered, I am very satisfied with e-procurement system.	1	2	3	4	5	6	7

SECTION E: DEMOGRAPHIC

Please answer the following questions by either filling in the spaces provided or ticking the boxes.

Gender	☐ Male	☐ Female
Education	☐ Certificate/Diploma ☐ Graduate (Bachelor Degree)	☐ Postgraduate (Masters Degree/PhD) ☐ Other ………………
Age	☐ 20–29 years old ☐ 30–39 years old	☐ 40–49 years old ☐ 50 years old and above
Job Type	☐ Managerial	☐ Clerical
E-procurement use experience	☐ Less than 6 months ☐ 6–12 months ☐ 1–2 years	☐ 3-4 years ☐ 5 years and above
Number of years your PTJ using e-procurement ……… years. ***Your PTJ "Pusat Tanggung Jawab" name is………………………………………………………*** ***e-mail address/ contact #*** *(optional):*		

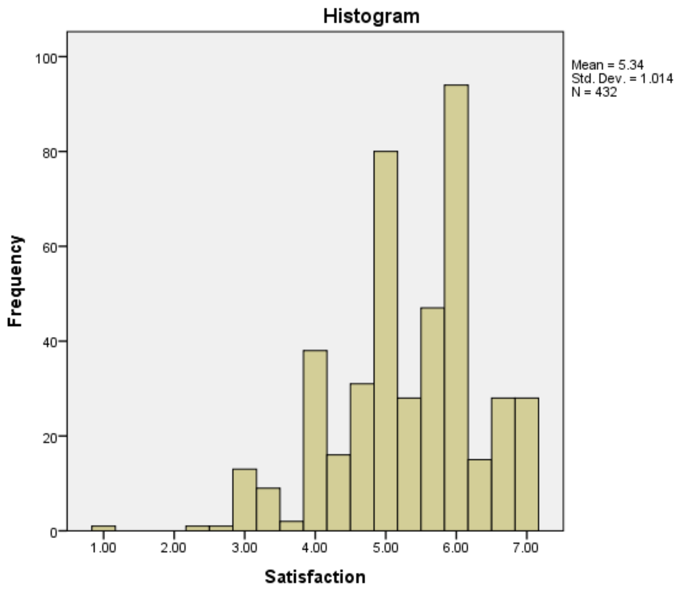
Thank you for your cooperation …

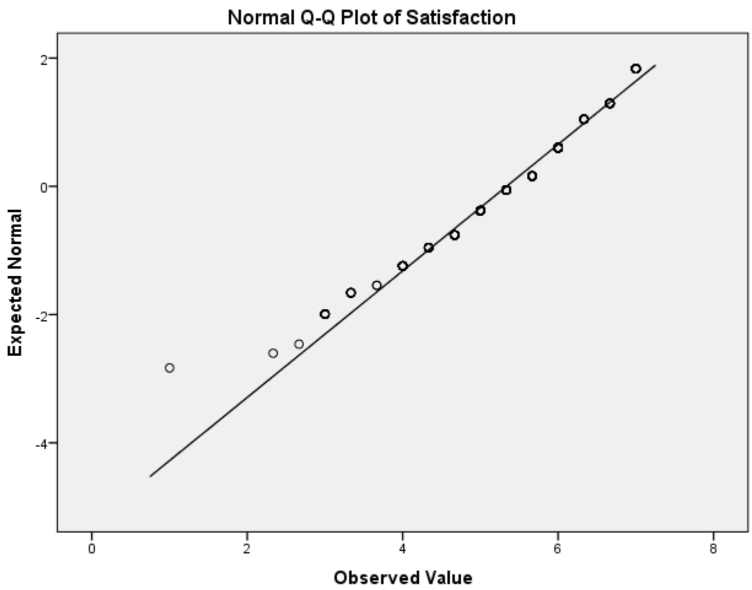
APPENDIX B

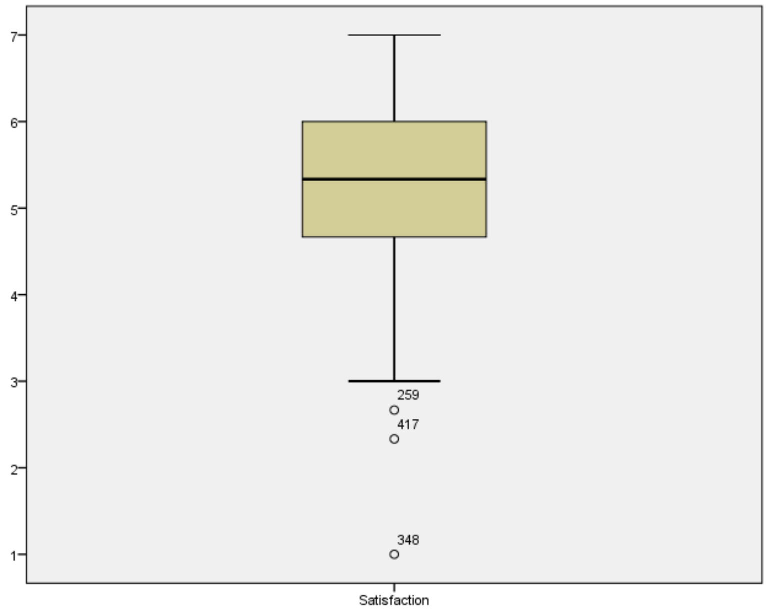
Data Analysis Outputs

B-1: Outliers

Satisfaction

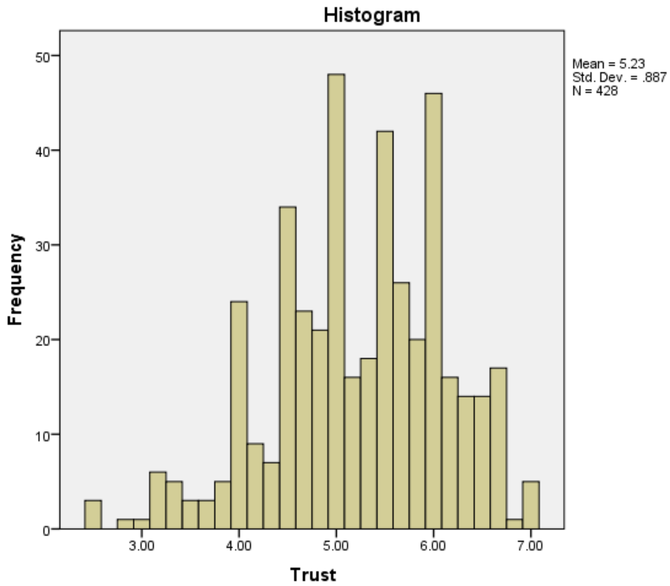




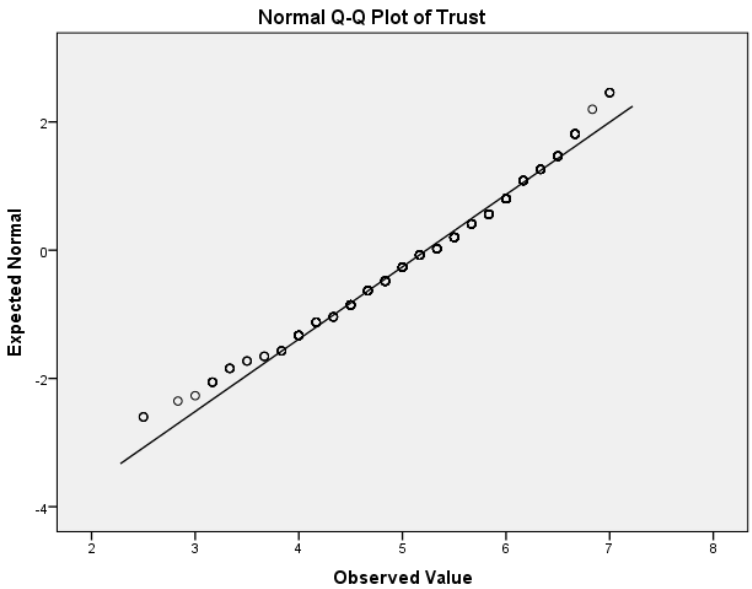


7
6
5
4
3
2
1
259
417
348
Satisfaction

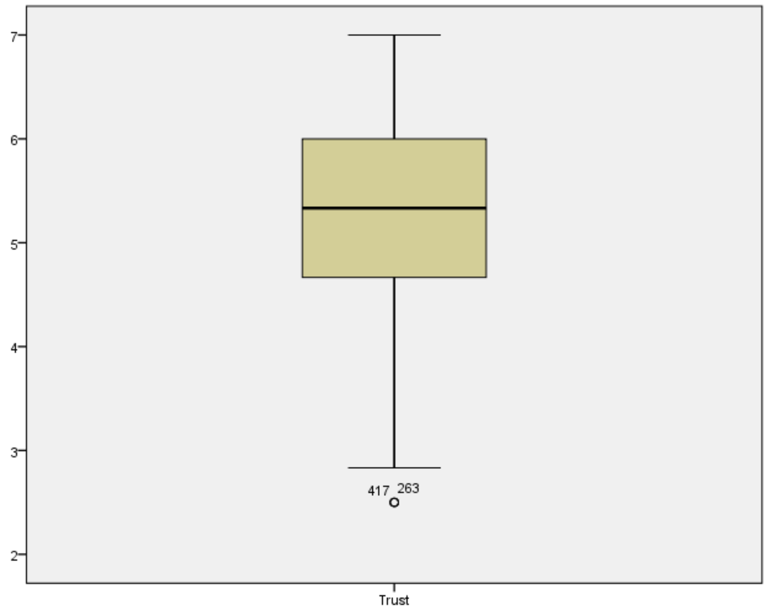
Trust



Histogram
Mean = 5.23
Std. Dev. = .887
N = 428
Frequency
Trust

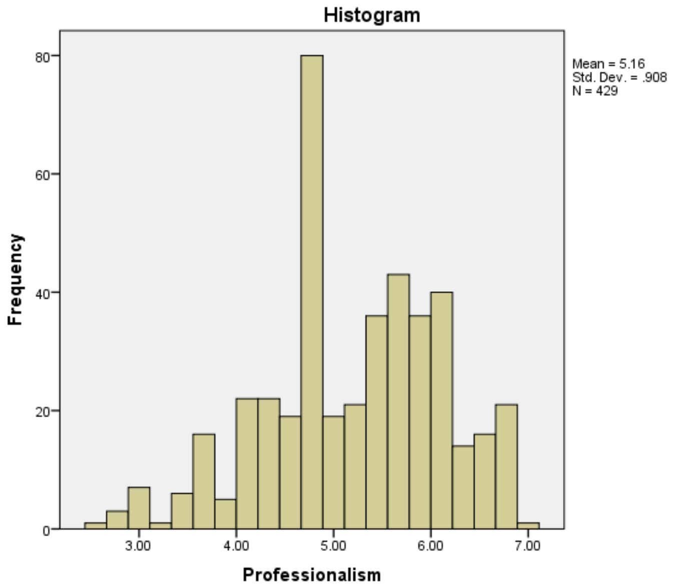


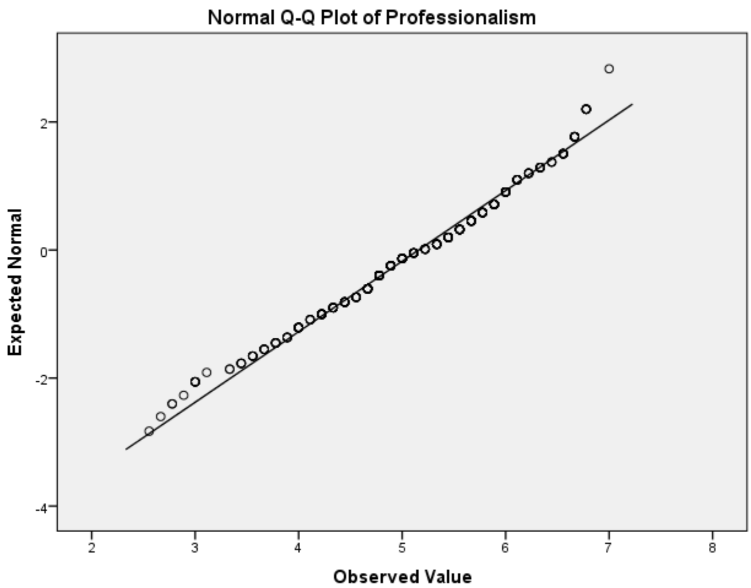
Normal Q-Q Plot of Trust
Expected Normal
Observed Value

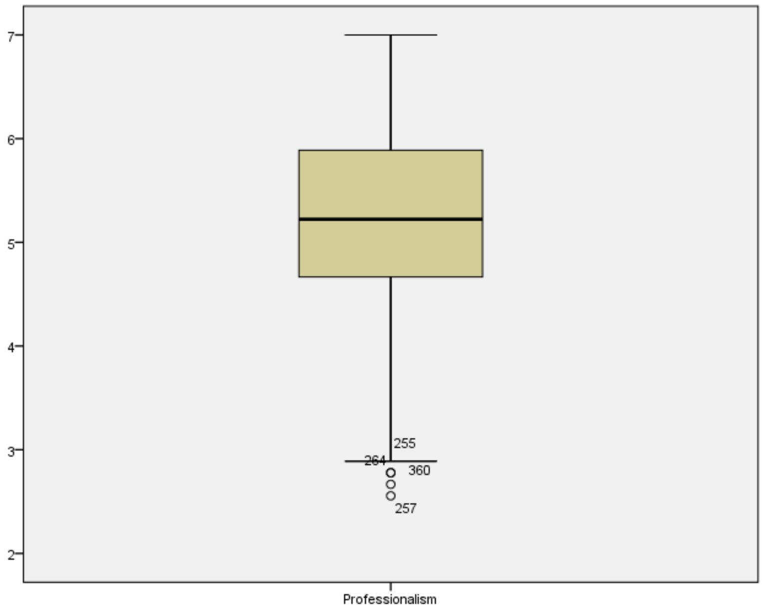


7
6
5
4
3
2
417
263
Trust

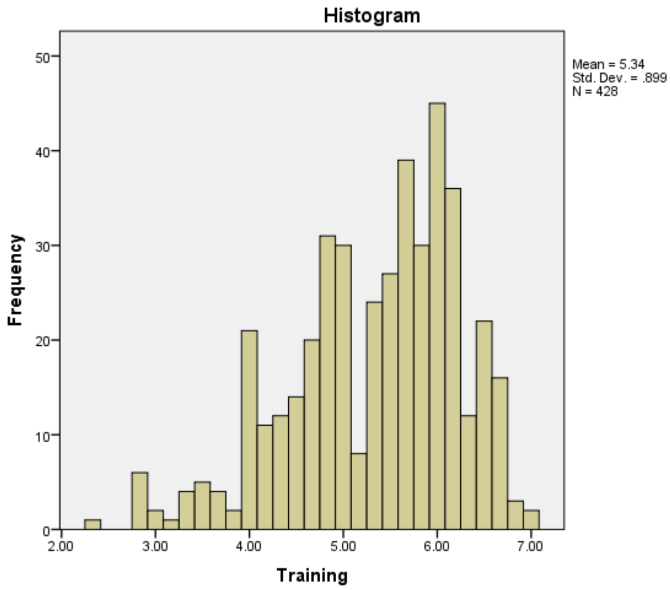
Professionalism

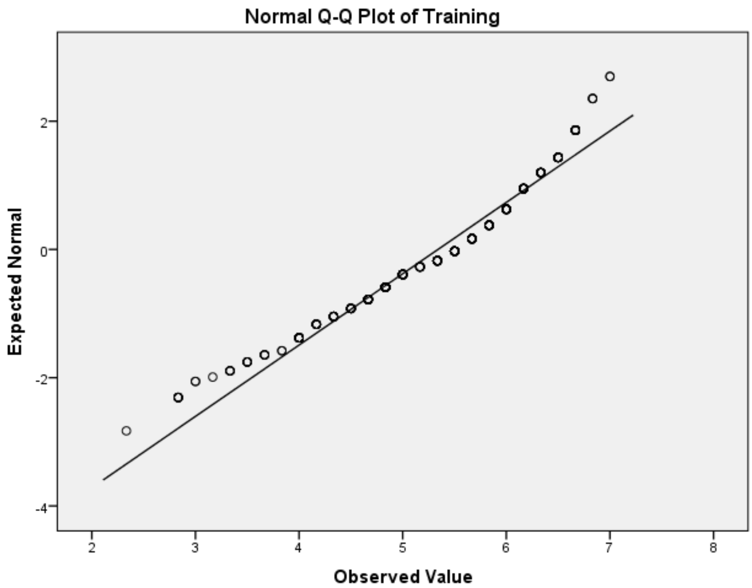


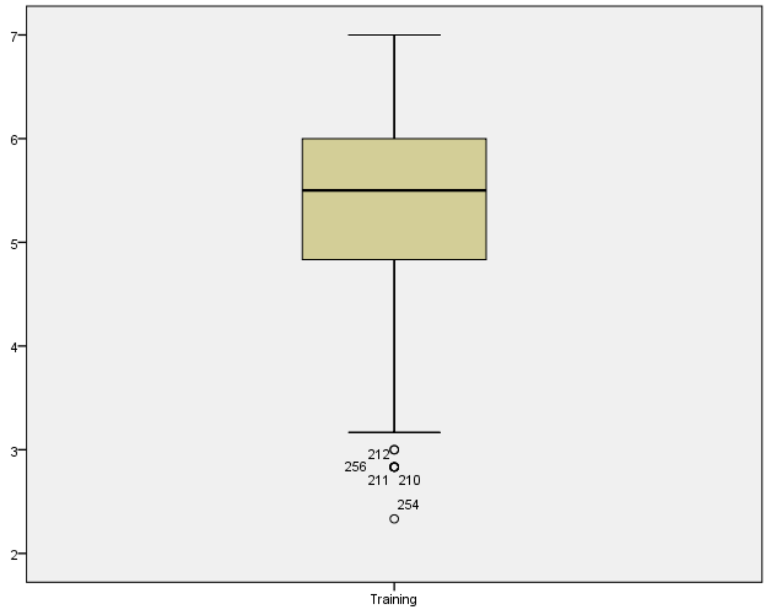



7
6
5
4
3
2
255
264
360
257
Professionalism

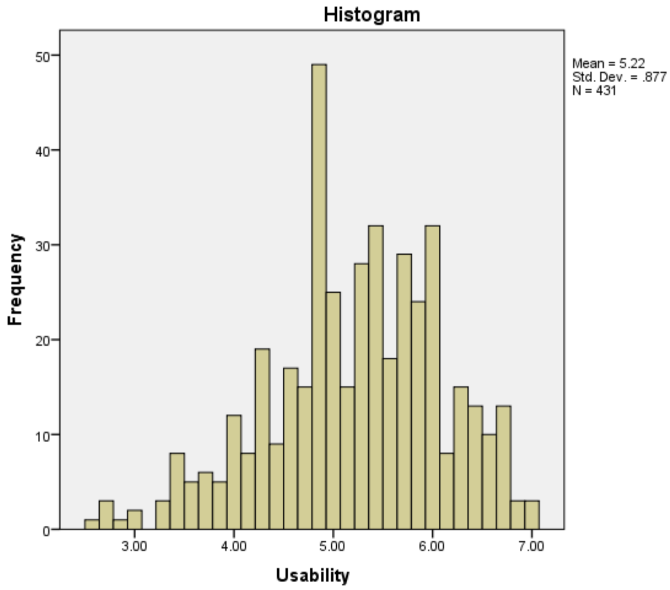
Training

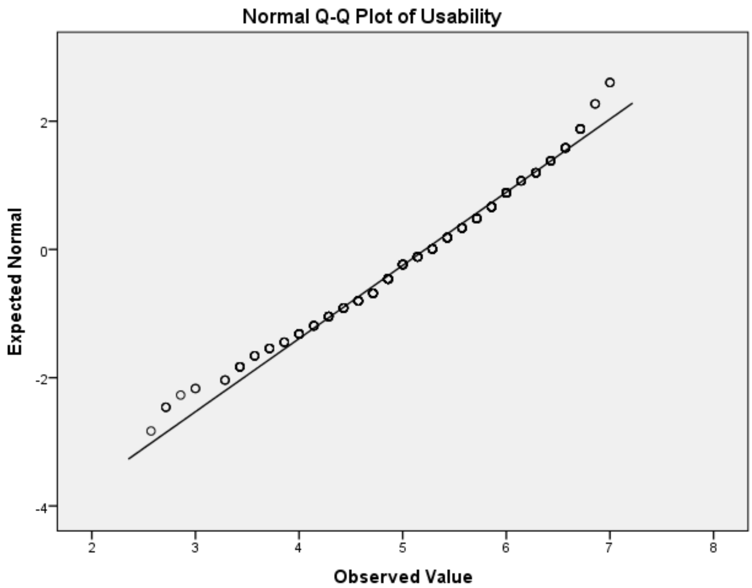

Histogram
Mean = 5.34
Std. Dev. = .899
N = 428
Frequency
Training

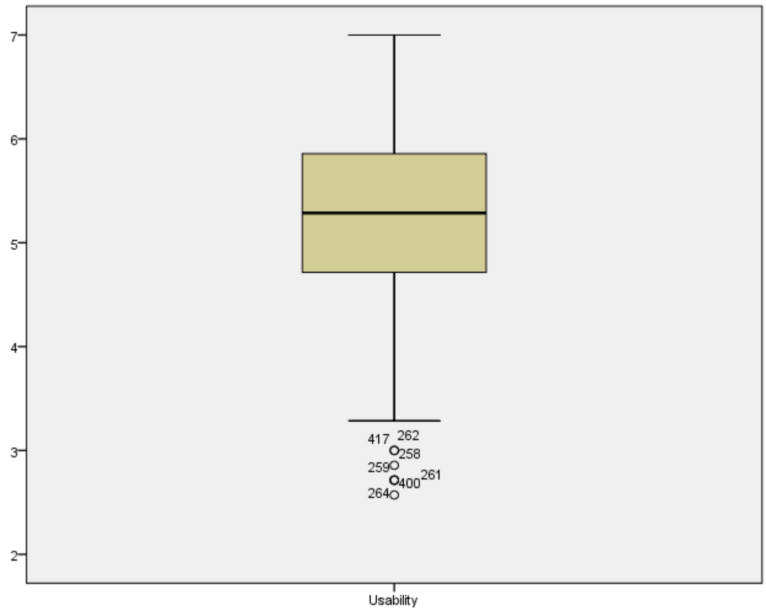

Normal Q-Q Plot of Training
Expected Normal
Observed Value


7
6
5
4
3
2
212
256
211
210
254
Training

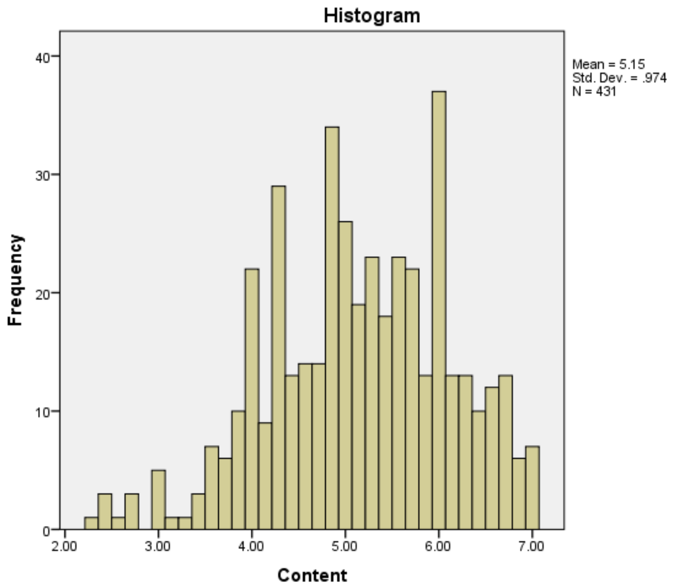
Usability


Histogram
Mean = 5.22
Std. Dev. = .877
N = 431
Frequency
50
40
30
20
10
0
3.00
4.00
5.00
6.00
7.00
Usability

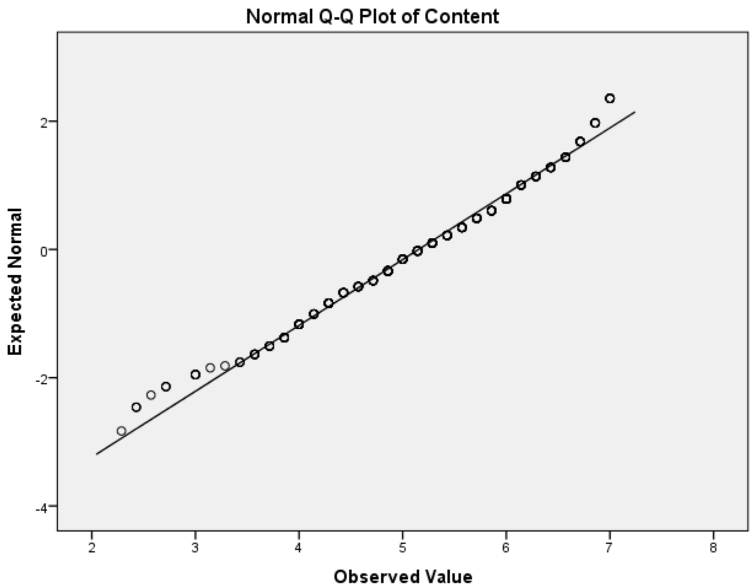

Normal Q-Q Plot of Usability
Expected Normal
2
0
-2
-4
2
3
4
5
6
7
8
Observed Value


7
6
5
4
3
2
417
262
258
259
261
400
264
Usability

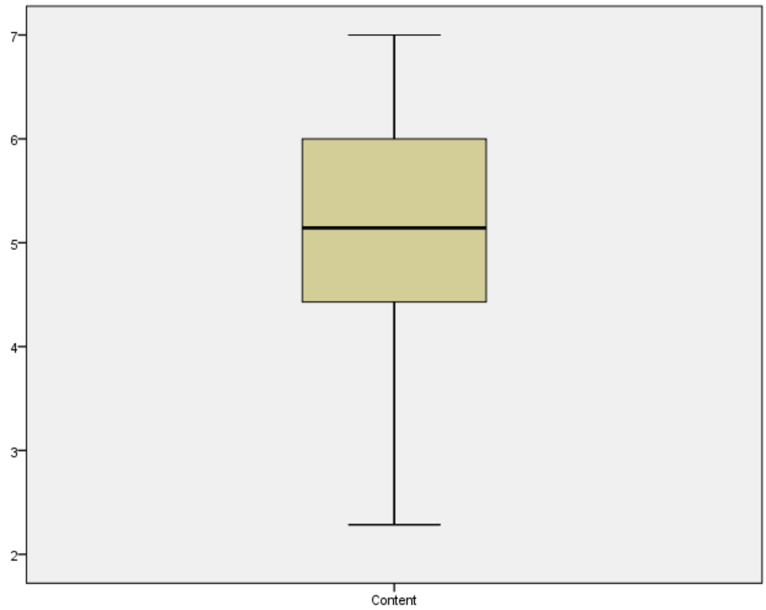
Content



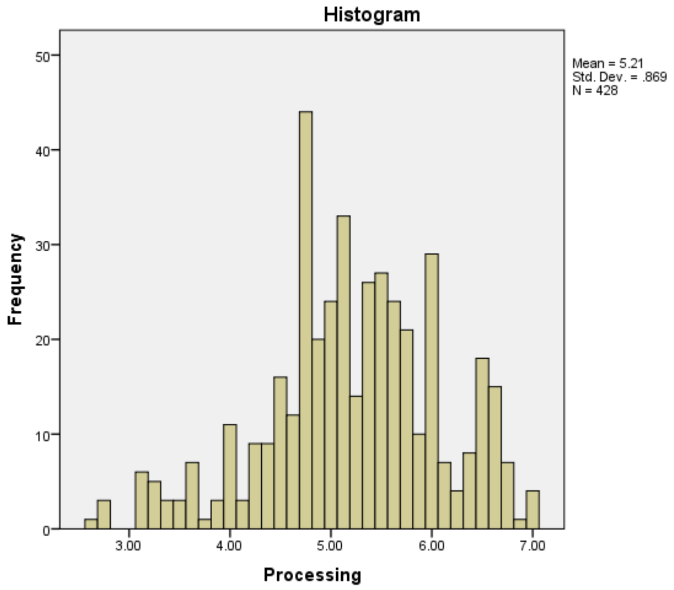
Histogram
Mean = 5.15
Std. Dev. = .974
N = 431
Frequency
Content
0
10
20
30
40
2.00
3.00
4.00
5.00
6.00
7.00

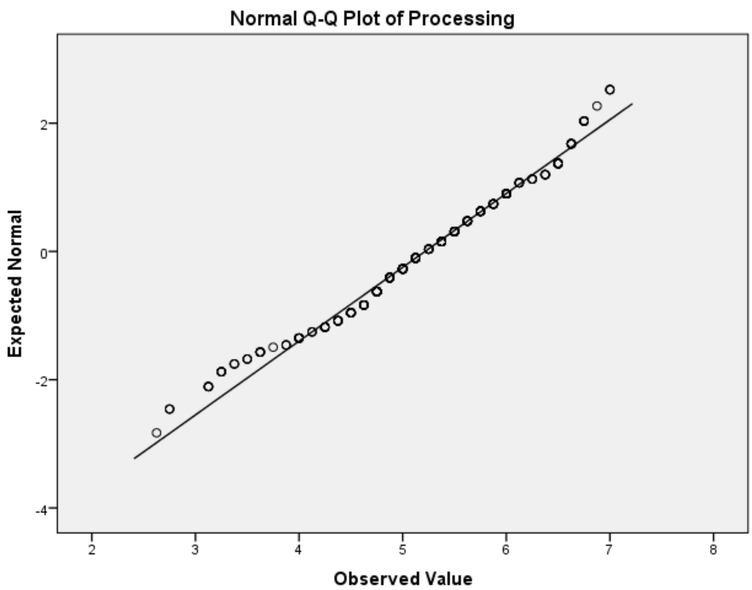


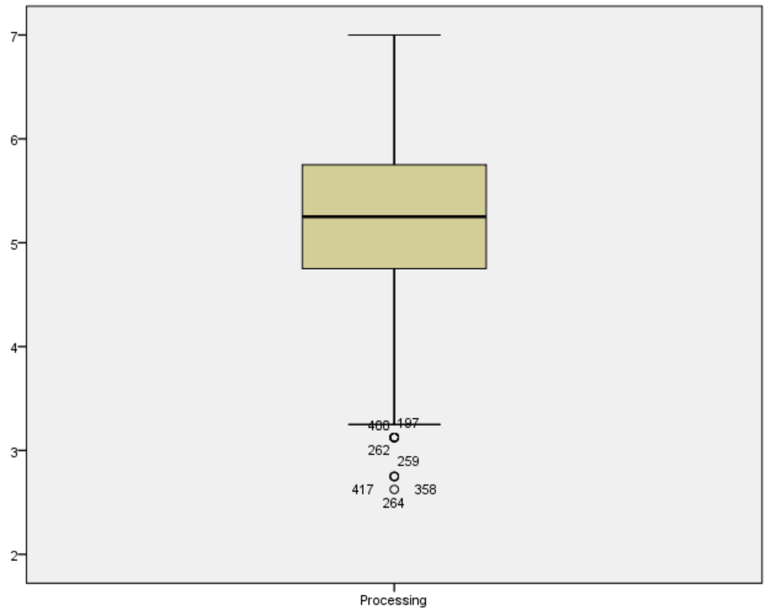
Normal Q-Q Plot of Content
Expected Normal
Observed Value
2
0
-2
-4
2
3
4
5
6
7
8


7
6
5
4
3
2
Content

Processing

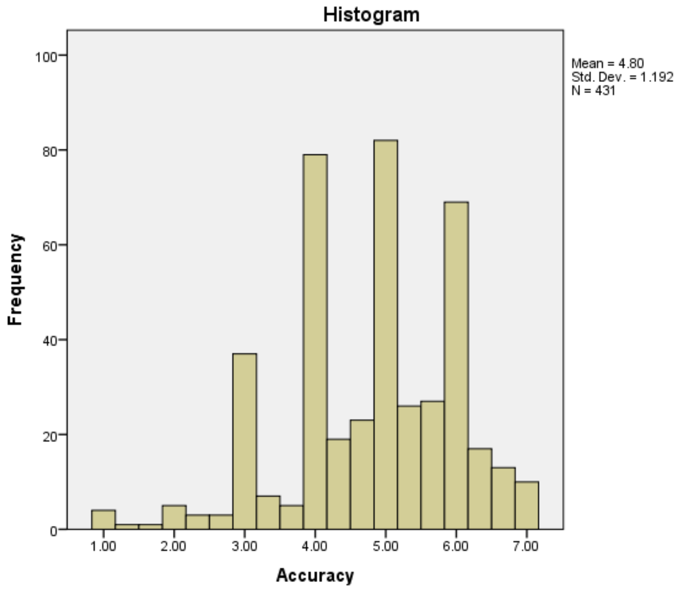

Histogram
Mean = 5.21
Std. Dev. = .869
N = 428
Frequency
Processing

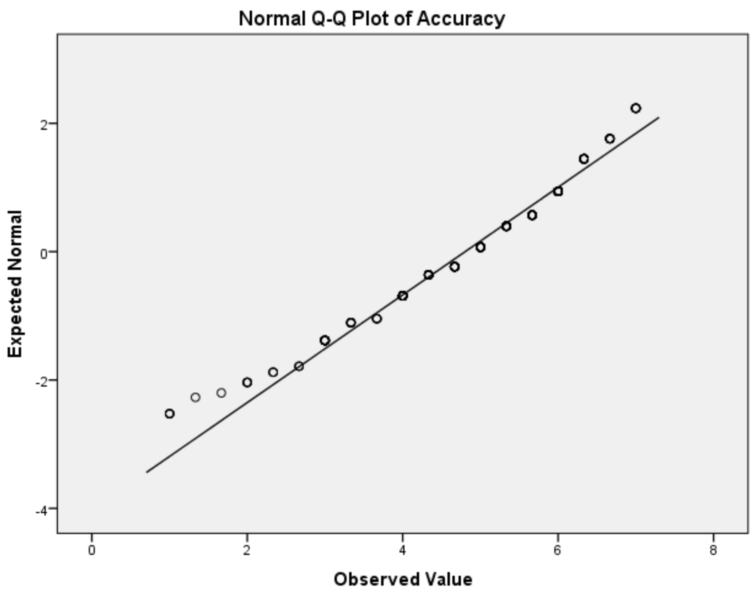

Normal Q-Q Plot of Processing
Expected Normal
Observed Value

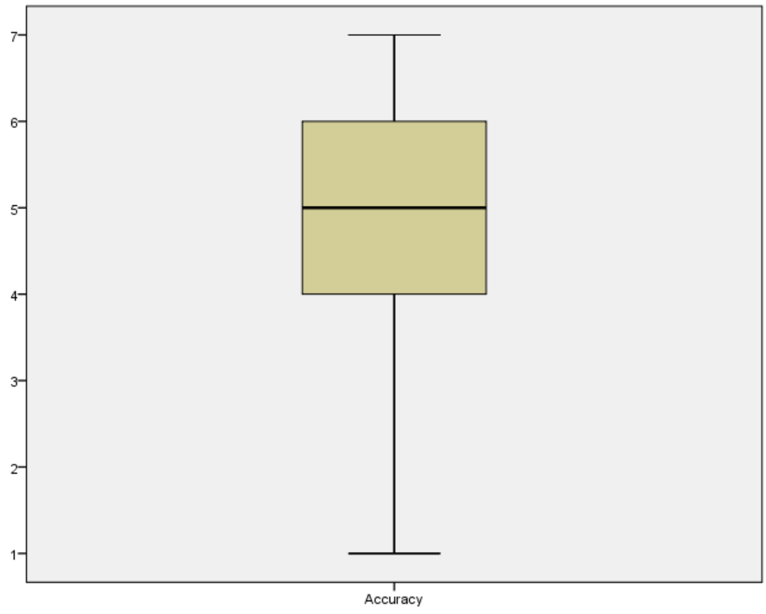


7
6
5
4
3
2
400 197
262
259
417
358
264
Processing

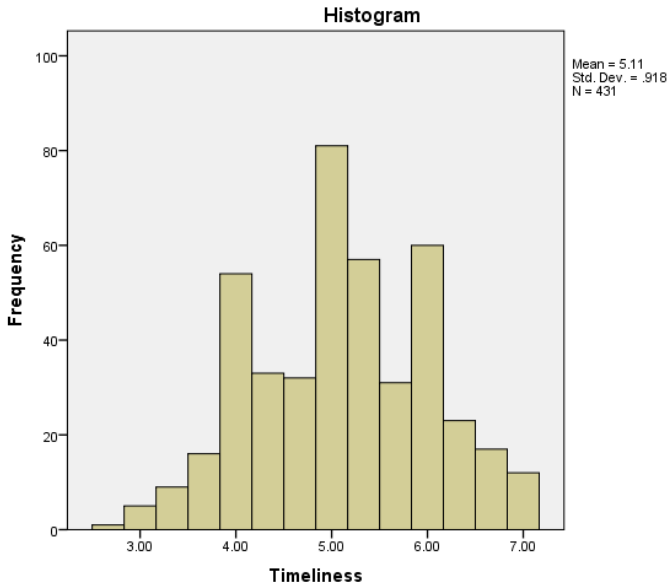
Accuracy

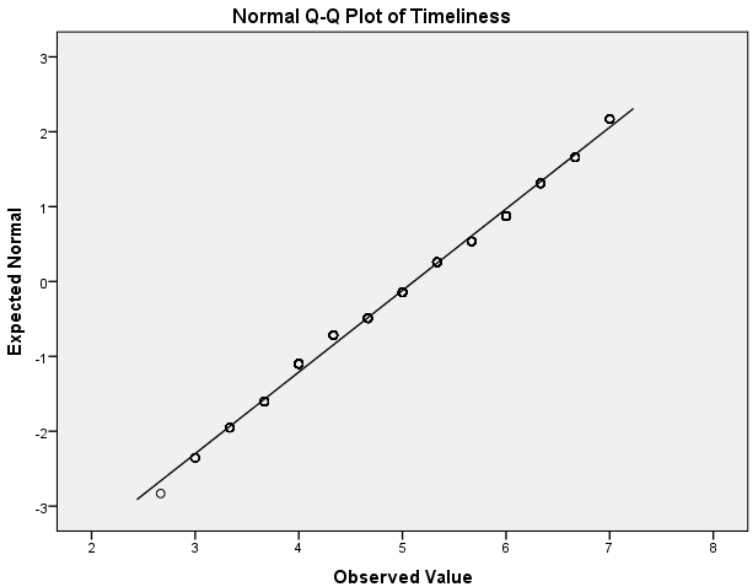

Histogram
Mean = 4.80
Std. Dev. = 1.192
N = 431
Frequency
Accuracy
0
20
40
60
80
100
1.00
2.00
3.00
4.00
5.00
6.00
7.00

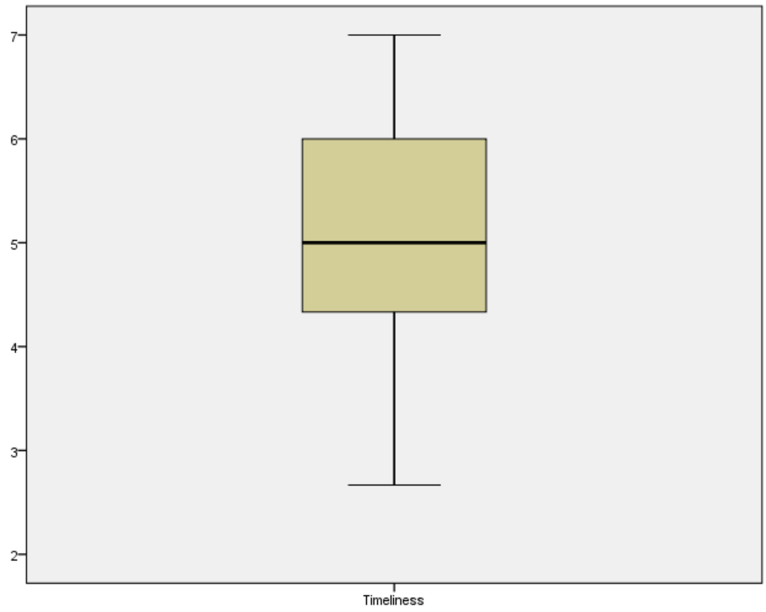

Normal Q-Q Plot of Accuracy
Expected Normal
Observed Value
2
0
-2
-4
0
2
4
6
8


7
6
5
4
3
2
1
Accuracy

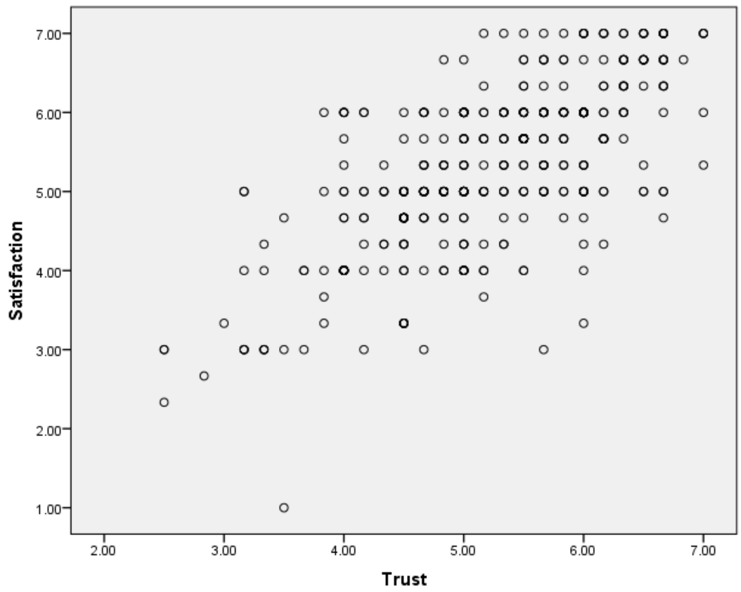
Timeliness

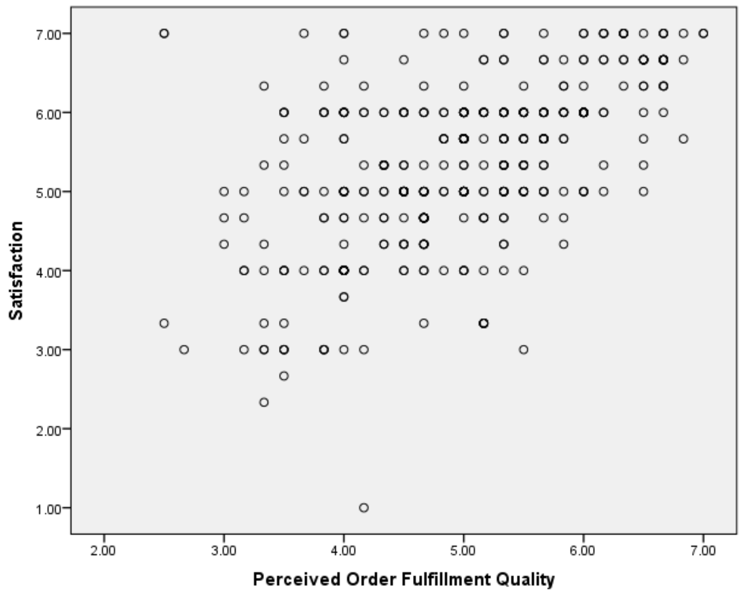

Histogram
Mean = 5.11
Std. Dev. = .918
N = 431
Frequency
Timeliness
0
20
40
60
80
100
3.00
4.00
5.00
6.00
7.00

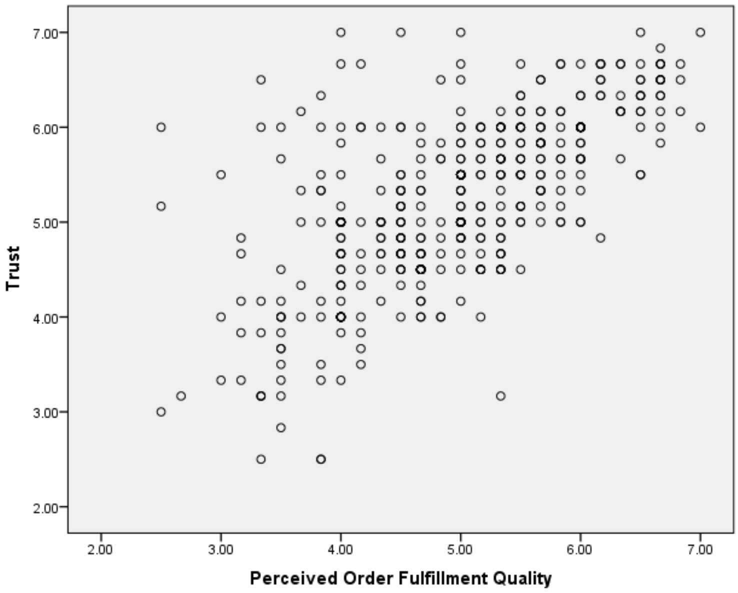

Normal Q-Q Plot of Timeliness
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
2
3
4
5
6
7
8


7
6
5
4
3
2
Timeliness

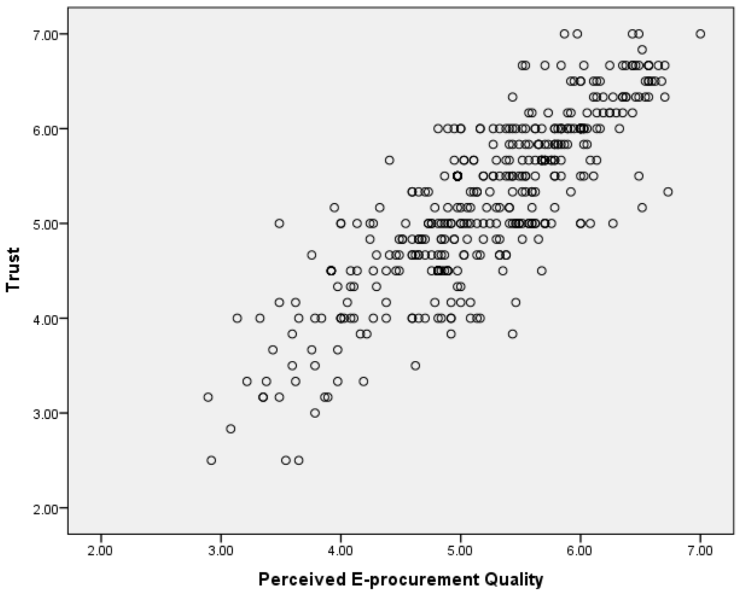
B-2: Homoscedasticity and Linearity



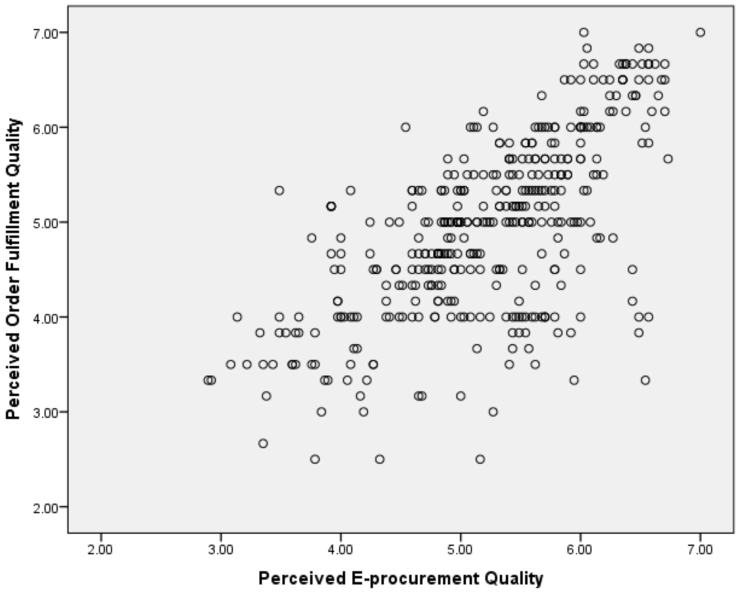




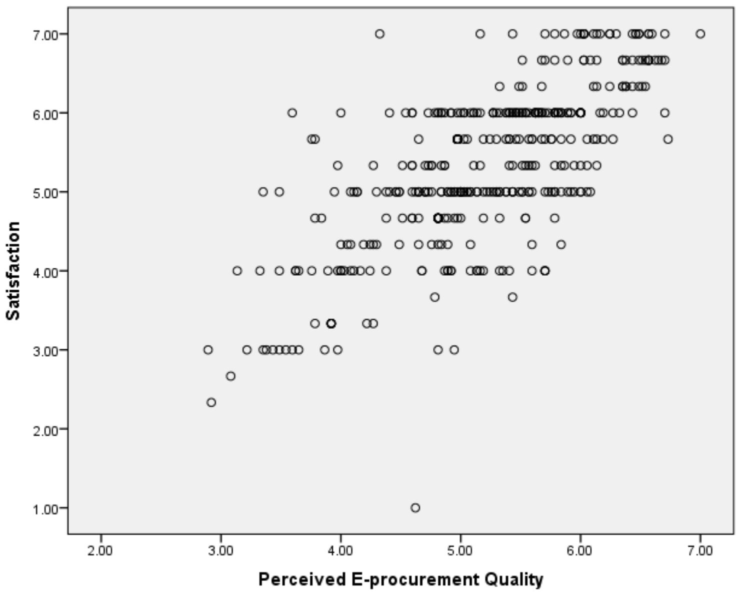
7.00
6.00
5.00
4.00
3.00
2.00
Trust
2.00
3.00
4.00
5.00
6.00
7.00
Perceived Order Fulfillment Quality



7.00
6.00
5.00
4.00
3.00
2.00
Trust
2.00
3.00
4.00
5.00
6.00
7.00
Perceived E-procurement Quality



Perceived Order Fulfillment Quality
7.00
6.00
5.00
4.00
3.00
2.00
2.00
3.00
4.00
5.00
6.00
7.00
Perceived E-procurement Quality



Satisfaction
7.00
6.00
5.00
4.00
3.00
2.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
Perceived E-procurement Quality

B-3: Multicollinearity

Correlations

	EUS	TRS	PRF	TRN	USB	CNT	PRS	ACU	TLN
End-user Satisfaction									
Trust	0.697**								
Professionalism	0.615**	0.716**							
Training	0.612**	0.684**	0.736**						
Usability	0.644**	0.740**	0.745**	0.677**					
Content	0.579**	0.691**	0.644**	0.579**	0.736**				
Processing	0.596**	0.722**	0.594**	0.601**	0.707**	0.697**			
Accuracy	0.352**	0.466**	0.347**	0.324**	0.402**	0.398**	0.454**		
Timeliness	0.632**	0.705**	0.613**	0.576**	0.662**	0.640**	0.626**	0.490**	

**. Correlation is significant at the 0.01 level (2-tailed).

EUS: End-user Satisfaction, TRS: Trust, ACC: Accuracy, TLN: Timeliness, CNT: Content, PRF: Professionalism, PRS: Processing, TRN: Training, USB: Usability

B-4: Measurement Items

#	Measurement Items - Perceived e-procurement Quality	Status
Professionalism		
PRF1	The procurement division is always available to deal with my queries or problems.	
PRF2	The procurement division always gets back to me when they say they will.	
PRF3	The procurement division responds quickly to my queries or problems.	
PRF4	The procurement division is flexible when dealing with unusual requests or problems.	
PRF5	The procurement division is knowledgeable in dealing with my queries or problems.	
PRF6	The procurement division deals effectively with any problems.	
PRF7	The procurement division deals confidentially with my queries or problems.	
PRF8	The procurement division shows concern when dealing with my queries or problems.	
PRF9	The procurement division is friendly when dealing with queries or problems.	
Training		
TRN1	The procurement division provides me with timely training to use the system.	***Dropped***
TRN2	The procurement division provides useful information about the system during the training.	
TRN3	... provides me with appropriate and specific training to use the system.	
TRN4	My level of understanding was improved after going through the training program.	
TRN5	The training gave me confidence in using e-procurement system.	
TRN6	The training was very detailed and at adequate length.	

#	Measurement Items - Perceived e-procurement Quality	Status
	Usability	
USB1	My interaction with e-procurement system is clear and understandable.	***Dropped***
USB2	It was easy for me to become skillful at using the e-procurement system.	***Dropped***
USB3		***Dropped***
USB4	The e-procurement system allows easy navigation through the process.	
USB5	The e-procurement system is available at all times.	
USB6	The e-procurement system is easy to use.	
USB7	The e-procurement system is flexible to interact with.	
	Processing	
PRS1	The e-procurement system has an efficient authorization process.	***Loaded on Usability***
PRS2	The e-procurement system is capable of processing complex orders.	***Loaded on Usability***
PRS3	The e-procurement system reduces the lead-time of orders.	***Loaded on Usability***
PRS4	The e-procurement system is secure in processing procuring transactions.	***Dropped***
PRS5	The e-procurement system is capable to ensure that the right goods or services are delivered.	
PRS6	The e-procurement system is capable to ensure that orders arrive on time.	
PRS7	The e-procurement system is capable to ensure that orders are processed quickly.	
PRS8	The e-procurement system is capable to ensure that orders get to suppliers quickly.	

#	Measurement Items - Perceived e-procurement Quality	Status
Content		
CNT1	The e-procurement system has the right number of suppliers registered.	
CNT2	The e-procurement system has the right number of catalogues uploaded.	
CNT3	The e-procurement system allows easy searching for suppliers or items.	
CNT4	The e-procurement system provides the accurate information I need.	
CNT5	The e-procurement system provides information content that meets my needs.	
CNT6	The e-procurement system provides reports that meets my needs.	***Dropped***
CNT7	The e-procurement system provides sufficient information.	***Dropped***

#	Measurement Items - Perceived Order Fulfillment Quality	Status
Delivery Accuracy		
ACC1	By using e-procurement system shipments rarely contain wrong items.	
ACC2	By using e-procurement system shipments rarely contain incorrect quantity.	
ACC3	By using e-procurement system shipments rarely contain substituted items.	
Delivery Timeliness		
TLN1	After participating in an e-procurement system time between placing requisition and receiving delivery is short.	
TLN2	After participating in an e-procurement system deliveries arrive on the date promised.	
TLN3	After participating in an e-procurement system the amount of time a requisition is on back-order is short.	

#	Measurement Items - Trust	Status
Trust		
TRS1	The e-procurement system is reliable.	
TRS2	The information available on the e-procurement system is trustworthy.	
TRS3	The e-procurement system can be trusted to carry out online transactions faithfully.	
TRS4	From my experience, e-procurement system is trustworthy.	
TRS5	Our suppliers are honest in dealing with us at all times.	
TRS6	Our suppliers keep their promises and commitments.	

#	Measurement Items - User Satisfaction	Status
Satisfaction		
SAT1	I am very pleased with using e-procurement system in my work.	
SAT2	My interaction with e-procurement system is very satisfying.	
SAT3	All things considered, I am very satisfied with e-procurement system.	

B-5: Exploratory Factor Analysis

Factor Loading									
	1	2	3	4	5	6	7	8	9
PRF1	.668								
PRF2	.807								
PRF3	.802								
PRF4	.594								
PRF5	.558								
PRF6	.515								
PRF7	.704								
PRF8	.665								
PRF9	.576								
CNT1		.527							
CNT2		.789							
CNT3		.821							
CNT4		.759							
CNT5		.697							
TRN2			.569						
TRN3			.636						
TRN4			.847						
TRN5			.818						
TRN6			.511						
USB4				.548					
USB6				.631					
USB7				.833					
PRS1				.716					
PRS2				.664					
PRS3				.665					
PRS5					.505				
PRS6					.556				
PRS7					.636				
PRS8					.625				
ACC1						.901			
ACC2						.974			
ACC3						.880			
TLN1							.741		
TLN2							.872		
TLN3							.816		
TRS1								.743	
TRS2								.846	
TRS3								.891	
TRS4								.808	
TRS5								.748	
TRS6								.646	
SAT1									.848
SAT2									.896
SAT3									.920

B-6: Confirmatory Factor Analysis

Cross Loadings

	ACC	CNT	PRF	PRS	EUS	TLN	TRN	TRS	USB
ACC1	**0.930**	0.349	0.312	0.392	0.314	0.415	0.307	0.421	0.347
ACC2	**0.964**	0.386	0.327	0.435	0.332	0.470	0.304	0.452	0.392
ACC3	**0.952**	0.404	0.349	0.464	0.354	0.512	0.315	0.462	0.407
CNT1	0.368	**0.843**	0.550	0.627	0.482	0.519	0.474	0.581	0.684
CNT2	0.366	**0.892**	0.531	0.629	0.515	0.547	0.514	0.622	0.616
CNT3	0.278	**0.858**	0.575	0.492	0.492	0.539	0.516	0.531	0.617
CNT4	0.369	**0.888**	0.602	0.613	0.509	0.607	0.493	0.636	0.662
CNT5	0.361	**0.875**	0.552	0.672	0.526	0.572	0.519	0.630	0.627
PRF1	0.310	0.446	**0.728**	0.430	0.432	0.443	0.498	0.544	0.491
PRF2	0.239	0.519	**0.808**	0.424	0.444	0.481	0.534	0.525	0.555
PRF3	0.275	0.500	**0.807**	0.473	0.462	0.515	0.511	0.535	0.585
PRF4	0.310	0.546	**0.822**	0.441	0.530	0.511	0.604	0.584	0.645
PRF5	0.306	0.572	**0.859**	0.526	0.549	0.564	0.685	0.643	0.671
PRF6	0.288	0.549	**0.825**	0.540	0.569	0.516	0.674	0.632	0.617
PRF7	0.260	0.550	**0.841**	0.494	0.502	0.501	0.592	0.573	0.620
PRF8	0.262	0.524	**0.843**	0.501	0.510	0.477	0.643	0.600	0.647
PRF9	0.303	0.524	**0.814**	0.542	0.514	0.495	0.670	0.607	0.633
PRS5	0.381	0.589	0.504	**0.843**	0.519	0.527	0.522	0.590	0.611
PRS6	0.394	0.608	0.529	**0.895**	0.547	0.554	0.560	0.646	0.636
PRS7	0.378	0.624	0.519	**0.868**	0.514	0.548	0.487	0.630	0.614
PRS8	0.418	0.590	0.508	**0.847**	0.486	0.535	0.507	0.629	0.586
SAT1	0.344	0.543	0.591	0.513	**0.913**	0.558	0.555	0.644	0.607
SAT2	0.286	0.533	0.567	0.544	**0.929**	0.597	0.586	0.624	0.582
SAT3	0.348	0.536	0.557	0.605	**0.938**	0.606	0.553	0.672	0.602
TLN1	0.461	0.541	0.539	0.556	0.585	**0.871**	0.577	0.633	0.592
TLN2	0.422	0.579	0.565	0.571	0.570	**0.896**	0.516	0.630	0.588
TLN3	0.415	0.567	0.511	0.523	0.511	**0.869**	0.429	0.591	0.563
TRN2	0.277	0.484	0.696	0.516	0.512	0.515	**0.846**	0.593	0.587
TRN3	0.322	0.547	0.663	0.548	0.501	0.543	**0.876**	0.602	0.607
TRN4	0.266	0.435	0.594	0.483	0.515	0.463	**0.871**	0.550	0.529
TRN5	0.291	0.457	0.547	0.540	0.531	0.462	**0.858**	0.583	0.539
TRN6	0.230	0.535	0.653	0.476	0.541	0.487	**0.817**	0.588	0.630
TRS1	0.406	0.540	0.560	0.563	0.556	0.571	0.514	**0.787**	0.616
TRS2	0.406	0.567	0.561	0.642	0.571	0.566	0.573	**0.860**	0.600
TRS3	0.418	0.583	0.603	0.649	0.606	0.608	0.592	**0.881**	0.613
TRS4	0.404	0.539	0.559	0.622	0.558	0.545	0.526	**0.817**	0.573
TRS5	0.349	0.585	0.624	0.587	0.602	0.591	0.647	**0.831**	0.613
TRS6	0.336	0.593	0.622	0.503	0.550	0.595	0.517	**0.757**	0.644
USB1n	0.372	0.595	0.665	0.579	0.553	0.557	0.579	0.630	**0.853**
USB2n	0.308	0.631	0.621	0.545	0.535	0.579	0.558	0.594	**0.821**
USB3n	0.332	0.658	0.624	0.618	0.545	0.549	0.518	0.601	**0.852**
USB4	0.341	0.590	0.570	0.615	0.516	0.536	0.579	0.645	**0.810**
USB6	0.358	0.626	0.631	0.648	0.546	0.584	0.601	0.646	**0.857**
USB7	0.340	0.639	0.676	0.595	0.576	0.558	0.611	0.649	**0.886**